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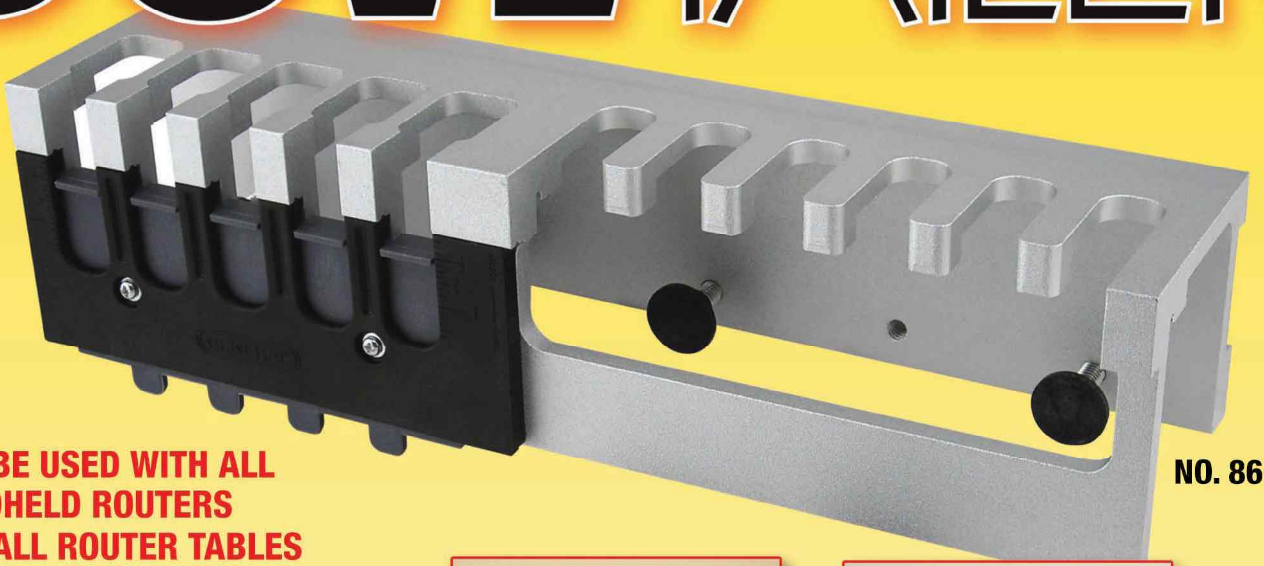

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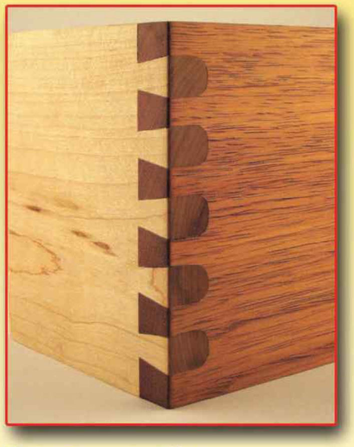

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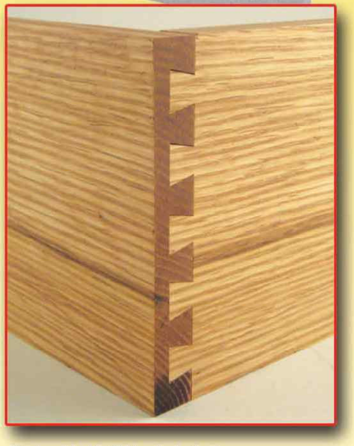

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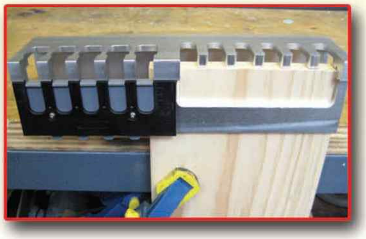

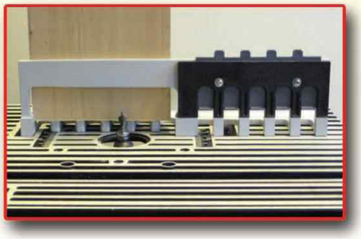

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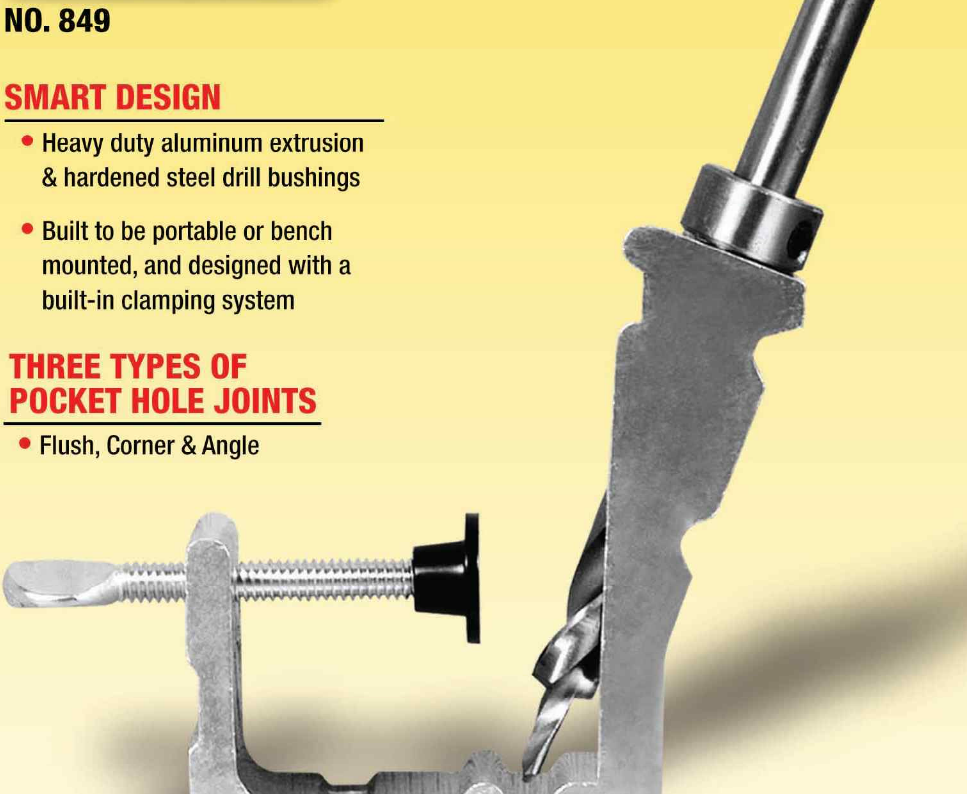
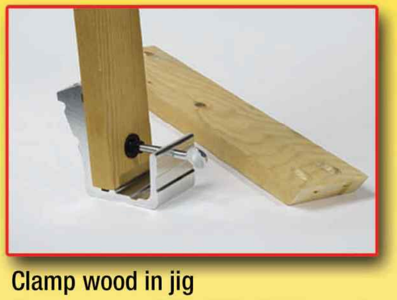
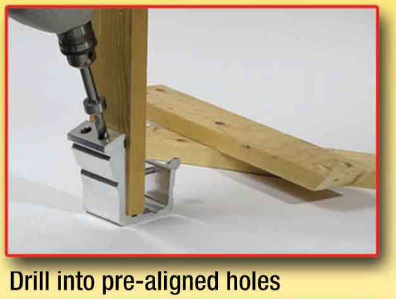
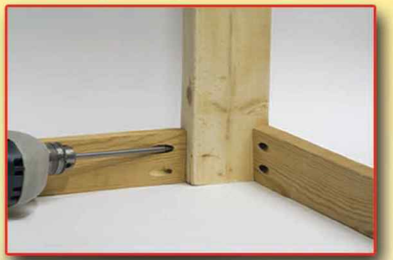




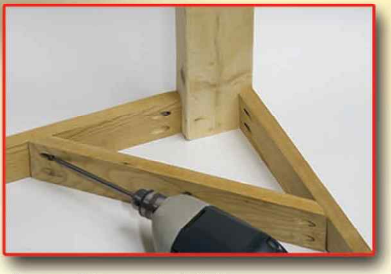
Clamp wood in jig



Drill into pre-aligned holes



Assemble flush & corner joints



Assemble angle joints

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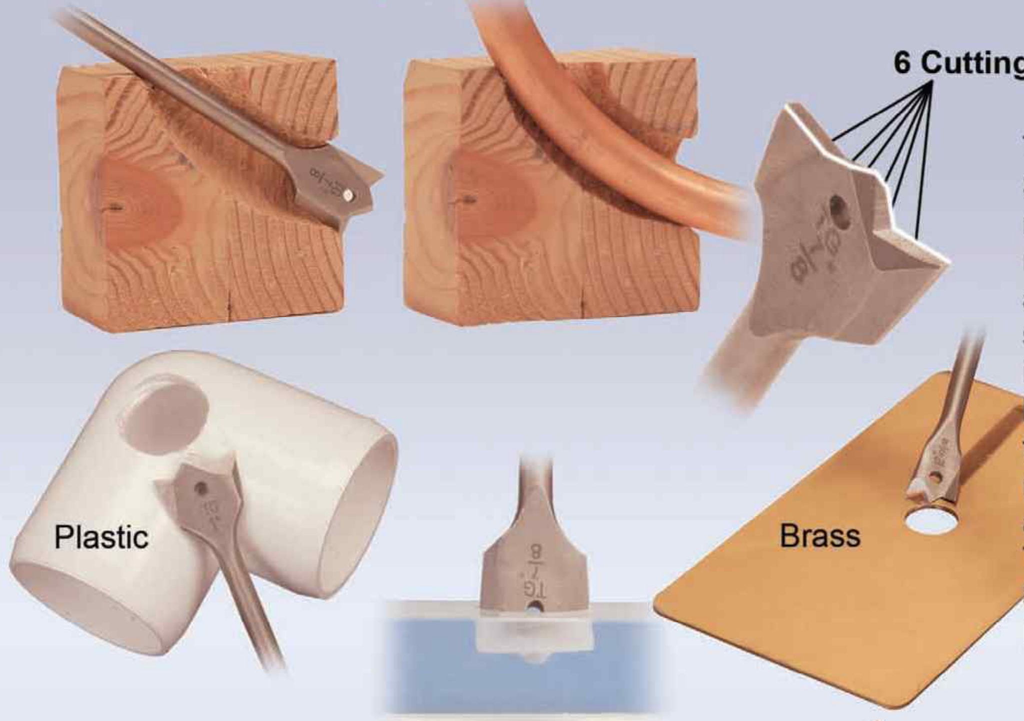

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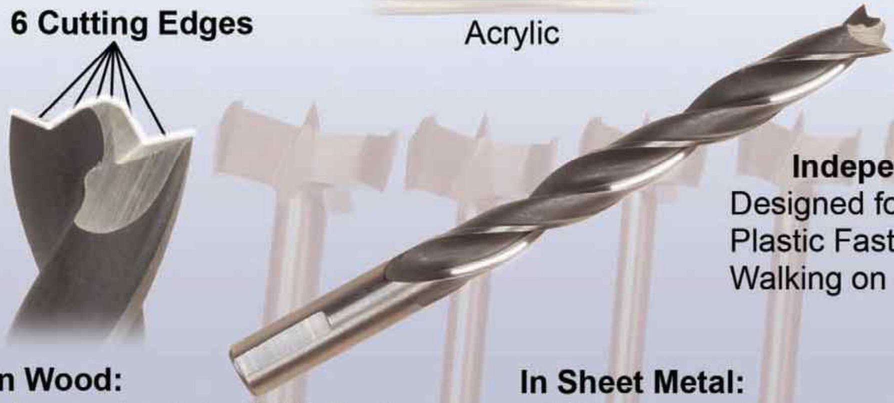

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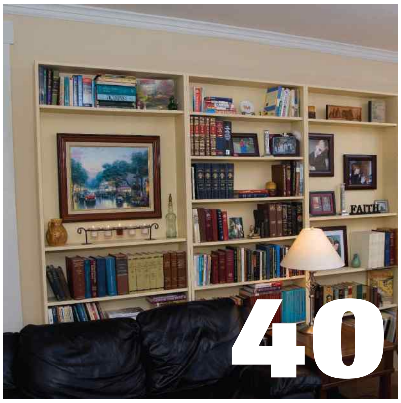

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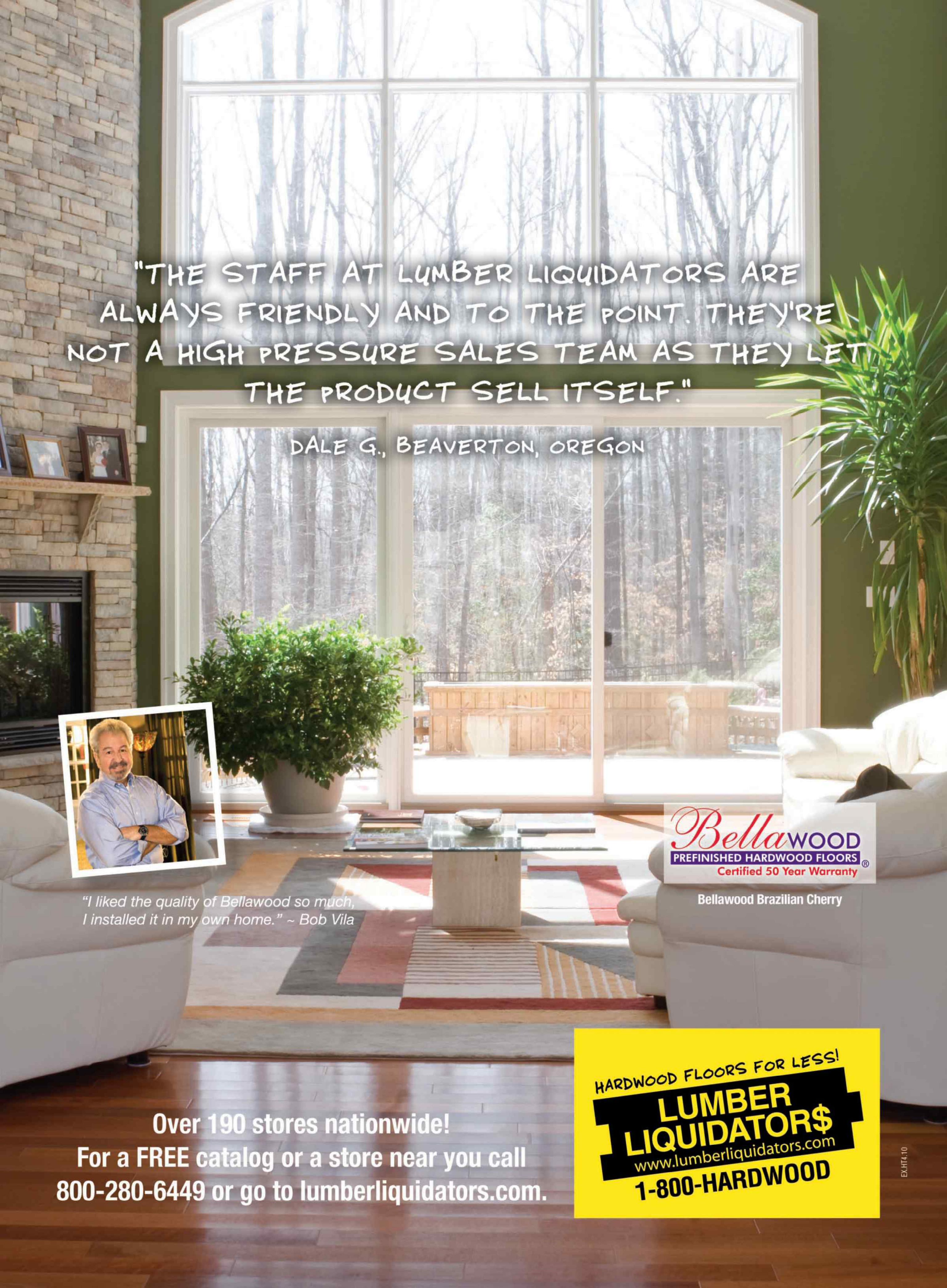

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LETTER

From The Editor-In-Chief

Every year at the International Builders' Show, I look forward to the NextGen Home, which is a finished house built on site of the convention center to exhibit the latest building systems and products in a real home environment. The theme of this year's NextGen "Builder's Challenge" Home was energy-efficiency, thanks to a partnership with the U.S. Department of Energy. Boasting a near zero energy rating, the NextGen "Builders Challenge" Home exceeds the DOE Builders Challenge specifications, a new program that allows builders to provide home buyers with an objective rating of a house's energy efficiency. To meet the Builders Challenge, a house must be at least 30 percent more energy efficient than a typical new home, or 15 percent more efficient than most current Energy Star requirements.

To optimize the home's energy rating, a wide range of the latest building materials and technologies were utilized, which you can expect to see in more and more new homes in the future. For example, the building envelope included a full line of DuPont Weatherization products, including the heat-reflecting Tyvek AtticWrap and radiant heat managing Tyvek ThermaWrap. Lennox Industries provided a whole home comfort system with a solar-assisted heat pump that can power HVAC and more. Additionally, a high-performance spray-foam insulation product was used that not only insulates but also air-seals in a single step, saving up to 50 percent on heating and cooling. The home also featured Low-E windows and doors that meet or exceed the highest energy standards. The new whole-house tankless electric water heater was 99.4 percent energy efficient, providing endless hot water and 25 to 50 percent lower energy bills. The home also featured water-saving offerings from Danze, including high-efficiency toilets that use 25 percent less water than a standard 1.6 gallon-per-flush toilet. Futhermore, the master bathroom utilized a low-voltage radiant floor heat system from our friends at STEP Warmfloor, which pulls only the energy it needs to maintain the chosen room temperature.

An exhibition house such as the NextGen home does a great job illustrating the latest energy-efficiency products and how they can be used together as an integrated home system, piggybacking the various cost and energy savings for a state-of-the-art "green" home with sights set on conservation for future generations. For those of you that weren't able to make this year's Builders' Show, you can still view photos and floor plans online, as well as learn more about the product lines, by visiting www.nextgenhome.com.

In the meantime, flip over to page 14 for an overview of some more product highlights we discovered on the show floor of IBS 2010.

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Extreme How-To is published by
LATITUDE3 MEDIA GROUP, LLC
1111 Edenton Street
Birmingham, AL 35242
Phone 205.949.1600 · Fax 205.949.1601
www.extremehowto.com

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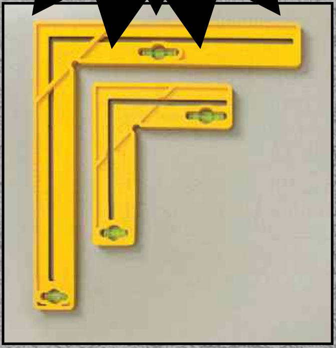

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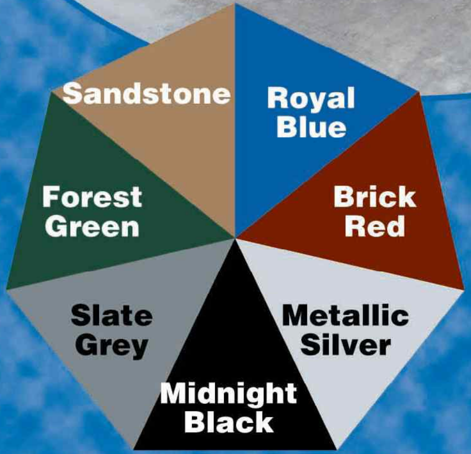
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Q: *How do I determine what size of air compressor to buy?*

A: The most important rating for an air compressor is the SCFM output. This is also the input rating that the air tool requires to operate properly. For best results, consider the tool that you anticipate using with the highest SCFM rating and purchase a compressor with an output of 1.5 times that rating. For example, if you want to use an impact wrench that requires 5.0 SCFM, you would want to purchase a compressor that puts out 7.5 SCFM. If you anticipate using multiple tools simultaneously, add the SCFM requirements for all tools and multiply by 1.5 when choosing a compressor to use. (Information courtesy Campbell Hausfeld, www.chpower.com).

Q: *How can I remove the haze that covers my car's headlights?*

A: The oxidization of the plastic housing on the headlight can definitely create a thick haze, which can worsen to point that is affects the light output. Kits are available at many automotive stores, which include the tools and materials you will need, but the kit costs about $30. For a less costly approach, try cleaning off the haze with some aluminum paste and a buffing disc in a drill. Operate the buffer much like polishing your car, but don't stop moving the buffer and don't run it for more than 30 seconds in one spot or you risk overheating and melting the plastic on the headlights.

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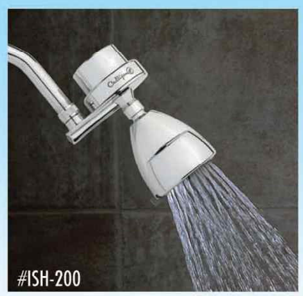

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A: Check with your local building codes. In many cases, a freestanding deck is acceptable if they meet certain requirements. Freestanding decks do not utilize the exterior wall of the existing house to support vertical loads. Instead, an additional cantilevered beam with posts located near the house wall provides the support. In some cases, the footings for the deck posts should be placed at the same elevation as the existing house footing, if located closer than 5 feet to an existing house wall. For houses with basements, a cylindrical footing is recommended to minimize excavation at the basement wall. Additionally, diagonal bracing should be used both parallel and perpendicular to the beam at each post. Furthermore, it may be required that a freestanding deck should be fastened to the existing house exterior wall, usually via the rim joist just like a ledger board, complying with the same lag screw (or thru-bolt) and flashing requirements.

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2-10

Q: *What is Cat-6 wiring?*

A: Whereas you're probably familiar with Cat-5 wiring, which is used for cable television among many other things, augmented Category 6 copper wiring, commonly referred to as Cat-6a, is its big brother. Cat-6a wiring was once preferred for commercial office environments but is now being implemented more and more for residential use. Cat-6a is designed to handle 10 Gigabits per second (10Gb/s) data rates. This makes it ideal for installing multiple applications through a network simultaneously. It allows large-file transfers and can support high-end security applications and the distribution of digital audio and video. To illustrate its speed, via a 10Gb/s connection rate, downloading a typical DVD of about 3GB would take around just 24 seconds. To hook up a High Definition Media Interface (HDMI), you need at least 5Gb/s for 1080 pixel quality, both of which are quickly becoming the benchmarks for any new TV purchase. To handle this technology, there are two choices: fiber optics and copper, and copper remains the more cost-effective option and it can carry lower levels of power for residential environments. Learn more at the Copper Development Association at www.copper.org. **EHT**

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Mini Systainer 68K43.00 $26.00
(shown with lid foam and drill bit and driver tray, sold separately)

Systainer 3
68K43.03 $69.00
(shown with lid foam, drill tray and 8-compartment tray, sold separately)

Systainer Dolly 68K44.30 $75.00

Example of how **Systainer Storage System** can be configured

Systainer 4 68K43.04 $74.00
(shown with lid foam, base foam and two layers of perforated foam, sold separately)

9-Drawer Systainer 68K44.09 $131.00

Latches lock a Systainer lid or connect to another Systainer stacked above.

The standard in Europe for organizing and transporting tools, accessories, and hardware, Systainers are an efficient and versatile storage solution. The name is a blend of "system" and "container", aptly describing how the components work together as a comprehensive and adaptable modular system. The system has interchangeable storage boxes, some with a hinged lid and a plain interior, others with drawers – all with a common footprint so they can be stacked and latched together. In addition, various trays organize smaller items, and foam inserts customize protection for specific items. This provides space-efficient storage that can be reconfigured for changing needs.

Recessed latches, handles and hinges make outer surfaces projection-free for safe handling. For easy transport, you can connect the containers you need and carry them as a unit by a single handle. An optional dolly base lets you roll the tools and supplies needed, all in one trip. A great method for organizing, storing and safely transporting gear. Made in Germany of strong ABS plastic, they come with a lifetime replacement guarantee.

For further product information and additional components of the Systainer® Storage System, visit our website.

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Builders' Show Highlights

New Products and Materials from the 2010 International Builders' Show

GAF
Low Slope Roofing Systems
GAF ELK
Steep Slope Roofing Systems
"Your Best And Safest Choice!"
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BUILD WITH US
LP

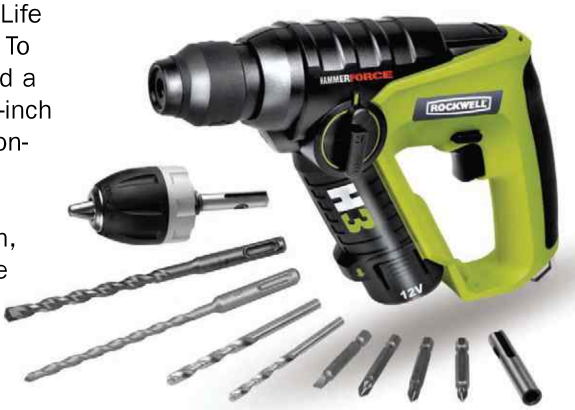
By Matt Weber

Each year a handful of the *Extreme How-To* staff attends the International Builders' Show (IBS), where manufacturers from all over the world exhibit the latest tools and materials for home construction. This January it was held in the Las Vegas Convention Center. During the day we worked the show and at night we would treat ourselves to mojitos at the Casa Fuente cigar bar or stuff our face with a pile of chicken, biscuits and potatoes and the Hash House-a-Go-Go. We lost money on slot machines, and we failed in our attempts to learn the game of craps. We also hung out with an Elvis impersonator and a showgirl. We even caught an off-broadway production of *The Lion King*.

This year the staff not only attended the show but exhibited as well, promoting *Extreme How-To* magazine at a booth of our own. We decorated it with a "basic black" theme, and even outfitted our floor with a roll-out black garage floor covering, courtesy of our friends at Better Life Technology (www.bltllc.com). To lure in the foot traffic we held a sweepstakes for a sweet 10-inch Makita sliding miter saw, sponsored by our friends at Tyler Tool (www.tylertool.com). We manned the booth in rotation, using our off-shifts to browse the show floor for cool new products and technologies. The following are a few highlights that caught our attention.

ROCKWELL'S H3 HAMMER-DRILL

Rockwell's H3 Hammer-drill is the first tool we've encountered that features the hammering action in a 12-volt model. Although it's not designed for everyday jobsite use, this three-function tool fills the niche for the serious DIY'er or tradesman who occasionally needs to drill a few holes in concrete or masonry, but doesn't want the cost or hassle of carrying a large, heavy-duty rotary hammer. The Rockwell H3 is a true rotary hammer-drill with an impact rate of 0-4800 blows-per-minute. It includes an SDS Plus quick chuck and weighs only 3 pounds for easy portability and storage. It also features a 3-in-1 quick change chuck system that allows the user to switch between using the tool as a rotary hammer-drill, a conventional three-jaw drill or a power screwdriver. A dial switch on the body of the tool lets the operator switch from hammer to drilling mode. The H3 is compatible with Rockwell's extended family of 12-volt lithium-ion power



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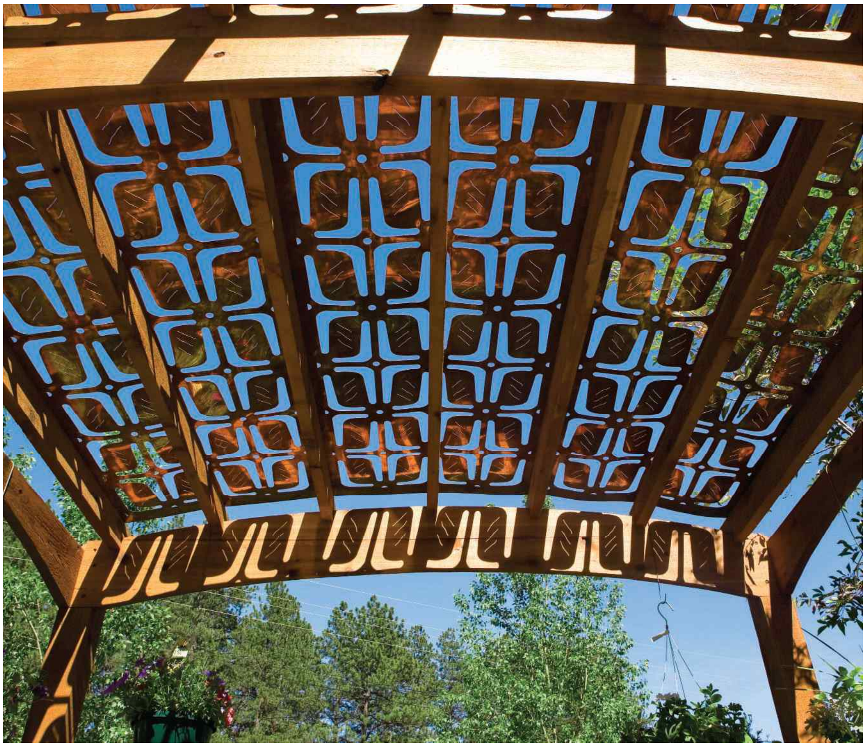
tools, and qualifies for the company's Free Batteries for Life program. Learn more at www.rockwelltools.com.

PARASOLEIL SHADE PANELS

Parasoleil manufactures architectural shade panels cut with artistic, perforated patterns for decorative application on shades, awnings, pergolas, privacy screens and more. The standard 3-by-8-foot panel material is 16-ounce copper available in five patterns inspired from cultures around the world. The copper is a green-certified material with over 90-percent recycled content, and long-lasting since copper is both maintenance-free and does not rust or stain like steel. The panels add aesthetic appeal, the



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CertainTeed introduced the EnerGen Photovoltaic Solar Power Roofing System at IBS. Unlike other photovoltaic (PV) systems on the market, EnerGen

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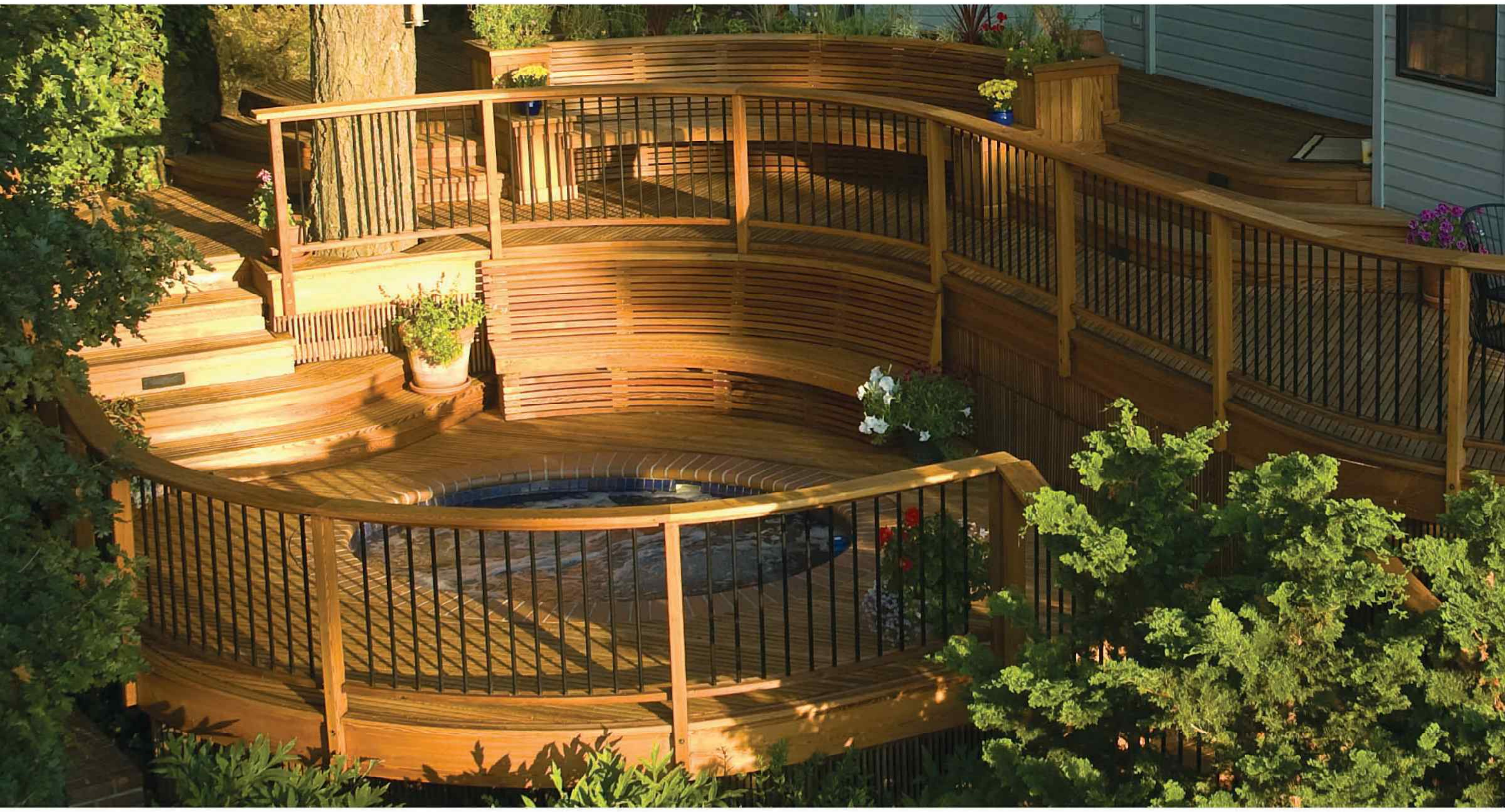

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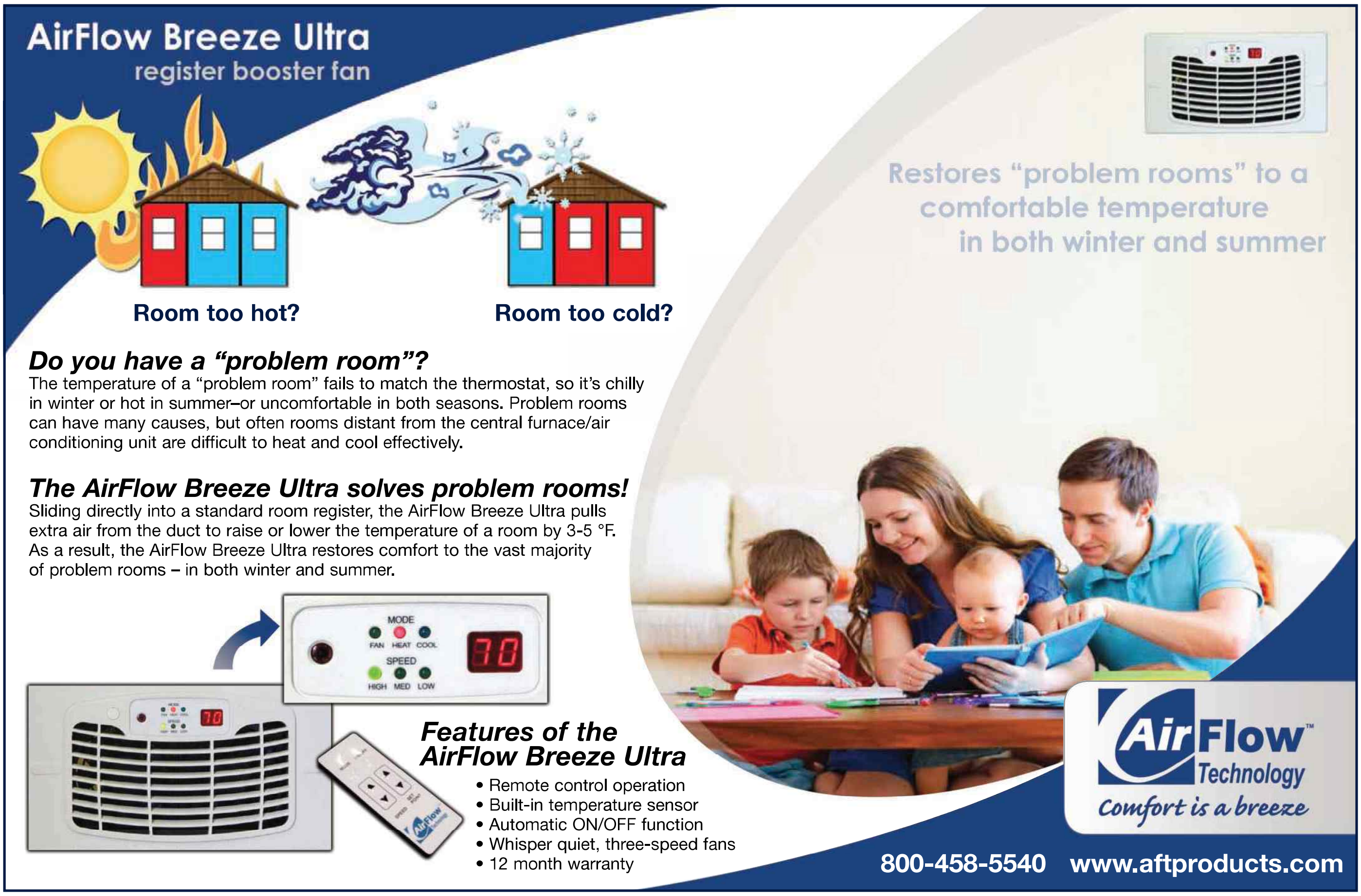
is specifically designed with conventional roofing systems in mind, offering ease of installation and vastly improved aesthetics for home exteriors. The EnerGen system features integrated UNI-SOLAR thin-film laminates, the world leader in flexible solar modules, which seamlessly integrate with traditional asphalt roofing shingles. The system's lightweight design requires no rooftop penetrations, making it easierfor contractors to install while maintaining roof deck integrity. The laminates lie flush with the remainder of the traditional roofing shingles, providing a streamlined, visually appealing appearance. Learn more at www.certainteed.com.

CRAFTSMAN PAINT SPRAYER

The Craftsman C3 19.2-volt Paint Sprayer is equipped with an advanced delivery system that eliminates the need for diluting paint. The powerful 19.2-volt motor handles all latex and oil-based paints as well as wood stain. A quick-lock container securely locks into place to help prevent spills and allows for easy removal. Spray control is maxi-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mized through three various spray patterns to accommodate a variety of jobs. The noise-reduction feature enables quieter operation. The Craftsman C3 Paint Sprayer (#17597) will be available as an add-on tool to the C3 line without battery and charger for $69.99. It comes with an extra atomizer valve, wire cleaning brush, lubricant, 12-inch fan tip and round spray tip. Battery and charger are sold separately. Learn more at www.craftsman.com.

ECOSHIELD DECK TILES

EcoShield Deck Tiles from A.E.R.T. are fast and simple to install on patios, verandas, rooftops and virtually any level concrete or gravel surface. A.E.R.T. manufactures the tiles using unique processing technologies that encapsulate recycled wood fibers in recycled polyethylene plastic. Similar to A.E.R.T.'s MoistureShield composite decking, the product make-up resists rot, decay, moisture and insects, while reducing plastic waste going to landfills. EcoShield Deck Tiles contain a minimum 30-percent post-consumer recycled content, and 60-percent pre-consumer recycled content. EcoShield Deck Tiles come in two sizes—12-by-12-inch and 2-by-2-feet— and they snap together for simple and secure installation. Builders and homeowners can combine different patterns and colors to create unique styles suitable to any taste. They can also easily unsnap and reposition the tiles

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RIDGID JOBMAX MULTI-FUNCTION TOOL

The JobMax Kit is a unique new multifunction cordless tool system from Ridgid. It features three interchangeable heads powered by a compact base unit with 12-volt lithium-ion battery. The interchangeable heads are the 3/8-inch drill (pictured), right-angle impact and a ratchet head. The JobMax features a variable-speed trigger, a 3/8-to-1/2-inch adapter for use with all common sockets, LED work light for improved visibility in tight spaces, and a fast 30-minute charge time. Learn more at www.ridgid.com.

RIDGID
R82234

BOSCH GLL2-80 LASER LAYOUT TOOL

Choosing a laser layout tool has been a balancing act between rotary lasers (too expensive) and cross-line lasers (limited applications). The new GLL2-80 from Bosch Measuring Tools serves the middle ground as the world's first 360-degree dual-plane line laser. Bosch's GLL2-80 is capable of projecting constant lines on both vertical and horizontal planes, ideal for alignment and leveling applications when installing cabinets, floor and wall tiling, drop ceilings, interior framing, decorative finish

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and trim work and more. For specific applications, the GLL2-80 quickly switches between dual-plane, vertical-only and horizontal-only modes. The heart of the tool's innovation is Bosch's proprietary Cone Mirror Technology, which reflects a laser beam to project bright laser "chalk lines" in 360 degrees, rather than using a motor to rotate the beam. By reducing the number of moving parts, Bosch is able to produce a laser layout tool that is more compact, lighter, easier to calibrate and simpler to use overall. Learn more at www.boschtools.com.

RYOBI TEK4 DIGITAL MULTIMETER

Ryobi Introduces the Tek4 Professional Digital Multimeter powered by 4-volt lithium-ion battery Technology. Powered by 4-volt lithium-ion battery technology, this tool offers a number of advanced features, including a simplified mode-selection dial for quicker measurement mode selections, built-in probe storage, a kickstand and hook for convenience, and a large LCD display. It reads nine measurement modes with professional accuracy. This water-, dust- and impact-resistant professional digital multimeter

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RELIABOARD DECKING FROM TIMBERTECH

Timbertech now offers ReliaBoard, a cost-effective composite decking product that offers all the benefits of low-maintenance without breaking the bank. The savings are accomplished through a new board design that utilizes less composite material per deck board while still retaining structural integrity. ReliaBoard is a full 5.4-inch wide plank, backed by a transferable 25-year limited residential warranty and is produced with recycled wood and a mixture of consumer recycled and virgin HDPE (high-density polyethylene) plastics. ReliaBoard is also designed with a square-edge profile that provides a crisp, clean finished look. The deck boards have a flat grain surface pattern and come in two colors—Grey and Cedar—available in 12-, 16- and 20-foot lengths with a maximum 16-inch O.C. span rating. Learn more at www.timbertech.com.

HONEYWELL WIND TURBINE

Breakthrough turbine technology was on display at IBS in the form of the new Honeywell WT6500 Wind Turbine for residential usage. The Honeywell Wind Turbine is a gearless turbine that measures just 6 feet in diameter and weighs only 170 pounds. The turbine's Blade Tip Power System (BTPS) replaces the traditional gear box, shaft

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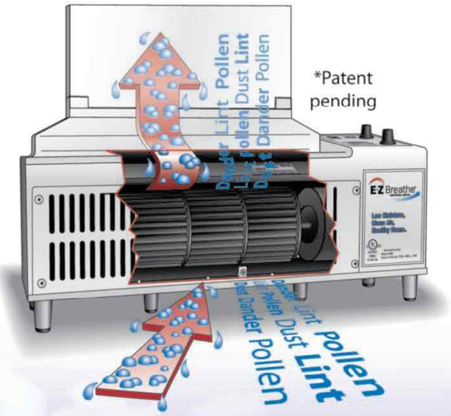
and generator of current wind turbine technology. The Honeywell Wind Turbine's gearless system creates a "free wheeling" turbine, generating energy from the blade tips (where the speed lies) rather than through a mechanical center gear. By practically eliminating mechanical resistance and drag, the Honeywell Wind Turbine is able to produce 2,000 kWh per year in class 3 winds, which according to the manufacturer, represents 18 percent of an average household's

annual electricity needs. It also operates at a greater range of wind speeds, generating electricity in as little wind as 2 mph. The Honeywell Wind Turbine WT6500 sells for about $6,000, but a 30-percent federal tax credit is available to offset the installed cost of the system. Learn more at www.windtronics.com.

INSOFAST INSULATED WALL PANELS

InSoFast, LLC provides a way to frame and insulate concrete walls, ceilings and floors in one simple step. The easy-to-install InSoFast panel is 4-by-2 feet and 2 inches thick, and locks together to create an R-10 system. Comprised of closed-cell expanded polystyrene and embedded studs, InSoFast provides a secure attachment for drywall, siding or subflooring. Drainage channels on the back side of the panel keep moisture away from the drywall. An integrated network of chases allow

pollen
animal dander
dust mites
fungus
bacteria
tobacco smoke
dust mites
bacteria
lint
lint
mold
pollen
lint
fungus
pollen
dust mites
dust mites
dust mites
pollen
animal dander
bacteria
cooking grease
mold
fungus
cooking grease
fungus
dust mites
dust mites
animal dander
bacteria
animal dander
fungus
tobacco smoke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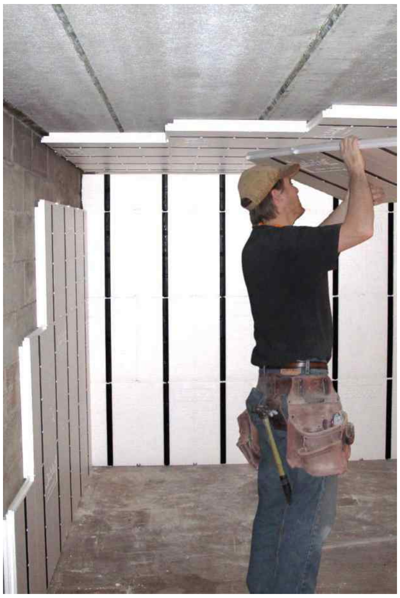

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BOLD THE MOLD

ING
ING

Create a new look for an old room by blending various trim styles and building a home-improvement design vocabulary.

By Mark Clement

The Madison Avenue advertising culture categorizes the magazine in your hands as a "shelter book." Too many shelter books are packed with pretty pictures of homes and a few buzz words, but there's often not a syllable about how to actually make it happen. As a contractor and homeowner with my own fixer-upper, I've been handed my share of pictures cut out from shelter books and been asked: Can you make my dining room look like this?

The answer is usually yes, but in figuring out how to pull it off there's been an unintended consequence: I've built a design vocabulary. And, now that I have it, I use it more than I ever thought. Truthfully, the nuance of design isn't something I gave much bandwidth to as a young carpenter, but lo and behold, it's an essential tool. I use it in every client meeting—especially those that involve my own home. More and more I'm called into an empty room (a cube of drywall) and tasked with turning it into something spectacular, and on a budget, naturally.

This is a labor of love because I adore houses, especially houses imbued with the charm of an identifiable architectural style, which I find is usually expressed in trim details. And it's trim work that brings me to the thrust of this piece: Bolding the Molding is "how-to" heavy, but its ulterior motive is to blend design sensibility with steel-on-wood detail for uniquely crafting new spaces.

While I welcome you to adopt the trim techniques shown here (all I ask is, as Kevin Costner said in Bull Durham, "When you speak of me, speak well"), I hope it fires some synapses to those more esoteric elements of design—stuff like proportion, mass, shadow, light and subtlety. Those elements form the outline of the drawings we "color in" with our miter saws and nail guns.

CROWNING GLORY

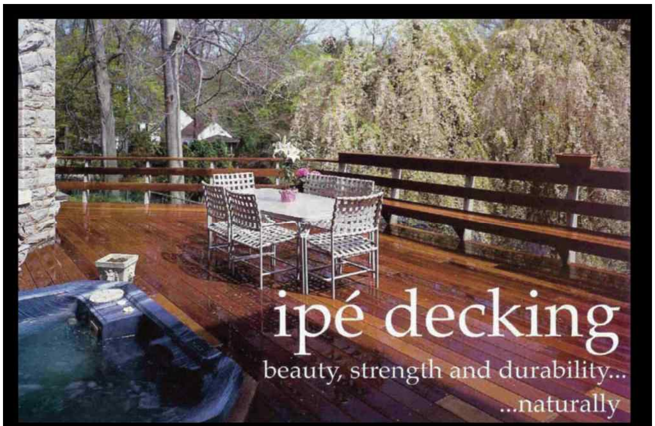
To say there's a bewildering assortment of crown moldings to choose from is an accurate statement. To narrow the field I walk the aisles of my lumber yard and home center and grab samples of the profiles that jump out at me. Then, I take cut-offs home (or to customers) and put them up in a ceiling corner, step back (or I stand on a ladder while my wife or customer steps back) and we take a look. It's an effective—and cheap—way to test out different looks, styles and sizes.

A note about molding sizes: Most houses I encounter have an 8-foot ceiling. Whereas higher ceilings afford more design flexibility, the 8-foot height usually truncates the mass of the molding you can use to anything 4-1/2 inches and under. Forcing an oversize molding into a too-small room—while tempting—overpowers the space. And, it comes too close to standard window casings, leaving you barely a sliver of wall space for paint. One way to gain space for a larger crown assembly in an 8-foot tall room is to incorporate trimless windows. (Editor's Note: Learn how to do this at www.extremehowto.com, by reading Mark Clement's article, "Add Flare with Trimless Windows.")

The trimless windows of the house shown allowed room to combine a lovely MDF crown from Lowe's new EverTrue brand molding (www.lowes.com). And, because I had the extra inches above the window, I beefed it up with base-molding backers along the wall and ceiling, delivering just the right mass and shadow line, elegance and detail for this room.

INSTALLING THE CROWN

The first thing I do in a project like this is to use blue tape to mark the stud locations. This allows me to find the studs quickly without punching holes in the drywall to locate them.



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I usually avoid MDF moldings because you can't cope them, but EverTrue is beefy and can be coped. However, when installing a three-piece package like this I miter all the corners so the joints between the wall-backer, crown and ceiling-backer line up. If you cope them, the joints are off-set and it shows up in the final finish.

When installing a three-piece crown, you apply the layers one course at a time, doing laps of the room with each layer. A small undulation in the ceiling is enough to throw the installation off by a mile if all you do is measure from the ceiling in a few spots. To make sure undulating walls and ceilings don't wreak too much havoc on the layout, I build a 30-inch long template of the finished assembly and map out each corner and a few spots along the wall. Even then, I usually have to make compromises to get the miters to fit and the reveals to look just right, but at least I have control points from which to make those compromises.

When fastening the ceiling backer, there are spots where there's nothing to nail to but drywall. Solve that dilemma by driving nails with a finish gun at

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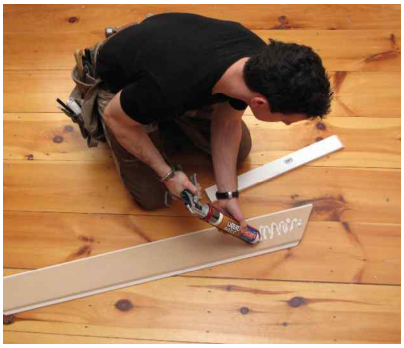
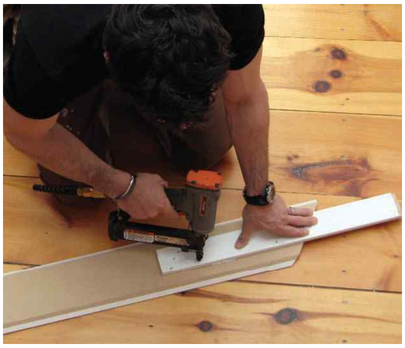
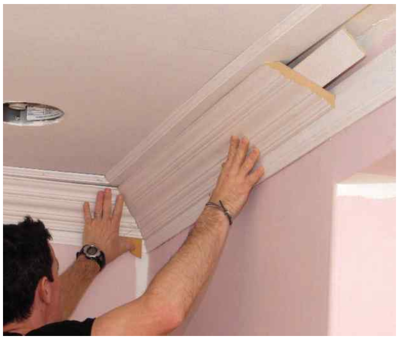
opposing angles (think of the nails forming an X shape in the ceiling above). This technique pins the wood to the drywall until caulk takes over.

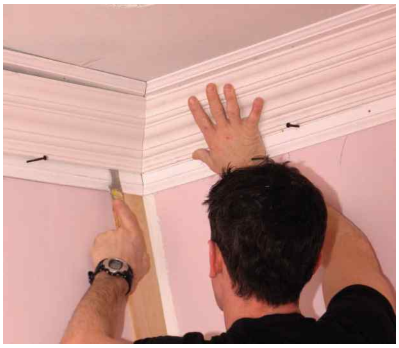
The longest I could get the Lowe's molding is 12 feet. I wish it came in 16's so I didn't have to scarf two pieces on my long walls. Nevertheless, I have a good system for dialing in scarf joints such that they're nearly invisible. The solution is gluing with Liquid Nails and stapling a backer using 1/4-inch narrow crown staples behind one leg of the crown. The backer helps the miters sit nice and flush with one another and provides solid nailing. I also dab the miters with a little Phenoseal to glue and seal them together—but a little goes a long way here. You only want a dab or two to seal the joint when you squeeze the pieces together. If you use too much, you have to squeeze out all the excess creating a mess.







Making seamless miters requires all kinds of compromises in a very small space—push the bottom of one piece up, the top of another down … There are lots of spatial dimensions to work with until the miters close. The point is, be ready with shims and a painter's 5-in-1 tool, which I love using use as a lever to move pieces so I can insert the shims. Once it's dialed in, nail it.



Note: Resist the urge to pepper the trim with nails. I've seen carpenters who think more nails somehow means better work. I hate to break the news, but it's better work that means better work. More nails than appropriate is just a hack-job in my book.

TIPS FOR DOOR TRIM

A Craftsman style door package looks slammin' with a stately crown like this. My control point for door openings is a level line at the top of the opening. From there, I measure down to the floor (which, in the houses I work on, can vary by more than an inch in 60 inches). That gives me the lengths of the jamb legs (from which I then subtract 3/4 inch to make room for the head jamb).

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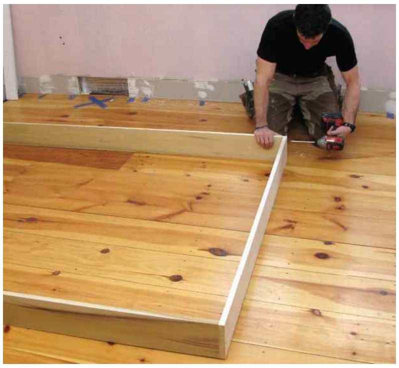
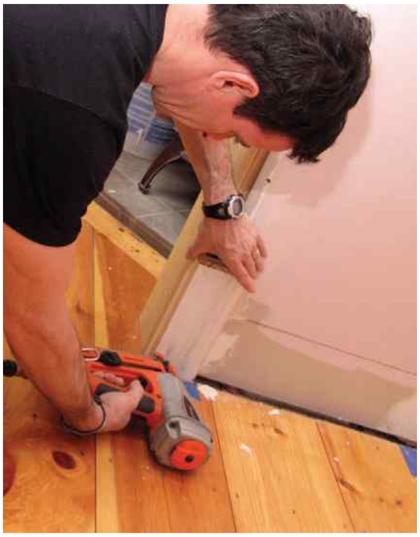
Next, I measure across the top to get the head jamb length. I cut all the pieces, then pre-assemble them with screws into a single unit. This increases accuracy and enhances accurate installation. Next, I tack the jamb unit with a few nails. Before nailing it off, I ensure everything is as flush as can be with the wall; I straighten it; I shim it; then I nail it.



I make plinth blocks from 5/4 stock. Here, they're 9-1/2 inches high, and I chamfered 3 edges with my router. They get installed flush to the inside edge of the jamb legs, with no reveal.



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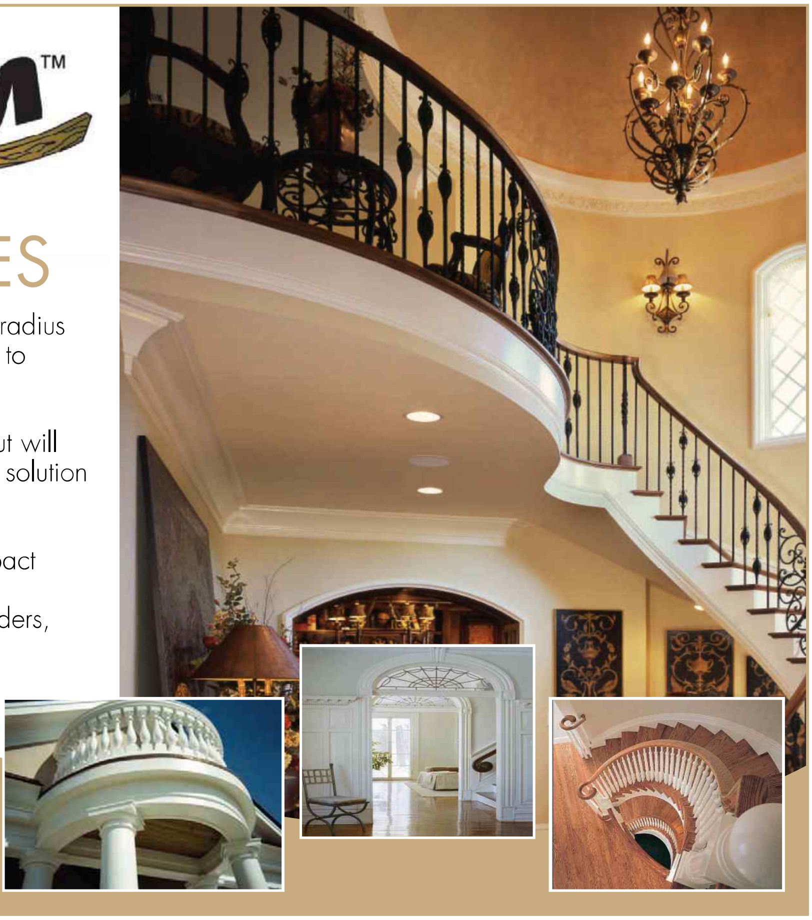
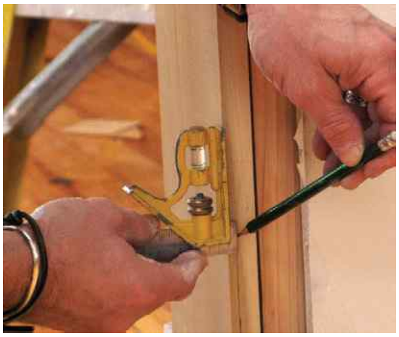


Next, I use one of my favorite tools—my 7-inch Stanley combination square—set it to 3/16 inch, and scribe the reveal for the jamb legs and head. At the intersection of the head and leg the pencil lines form crosshairs. From that crosshairs, I measure down to the top of the plinth block and that's the jamb leg measurement. I cut and install them.



The bead detail was also unavailable at my lumber yard, so I milled it from 1/2-inch stock using my router and a round-over bit. To register its length, I measure outside-to-outside on the jamb legs then add 1/2 inch. And, instead of dead-ending it, I carry the routed edge around and back to the wall with a return.

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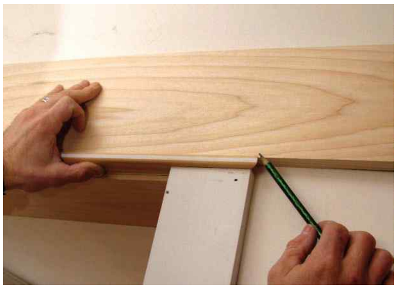
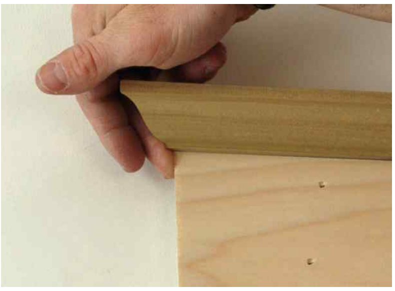
I register the head jamb's length off the bead. Instead of measuring it, though, I scribe it and add a return. Ditto on the crown detail. It's accurate and fast.





BACK TO BASE MOLDING

For the base molding I copied, sort of, the home's existing molding—a full 1-inch by 8-inch with a base cap. Instead of special ordering 5/4-by-8 stock, all I did was zap strips of 1/8-inch plywood along the wall with 3/4-inch narrow crown staples, and then popped standard pre-primed 1-by-8 to that. On top of the base, I installed a full 3/4-inch thick by 1-1/2 inch tall base cap.

It really works nicely! **Note:** Where the base meets the plinth blocks, there is no reveal, which looks off. To get a shadow line in there, I ran the same chamfer as the plinth on the end of the base—a perfect solution.

BLENDED STYLES, UNIFIED FEEL

If you're a purist, you can throw the design ideas in this piece out the window. Sure, the techniques work, but maybe the design isn't your bag.

For inspiration, I purloined looks from different forms and eras—everything from the American 4-square house design to Craftsman style trim, to mouldings (moldings with a U because they're that fancy) copied from a 200-year old estate but made with modern materials. And somehow it all crashes, or coalesces, into a high-fidelity whole that holds together.

And that's the point: You don't have to be pigeonholed by what you see on the shelf or in the shelter books! A working vocabulary of various architectural styles is the key to original work, and it's another thing that draws me to fixing houses. It presents the opportunity to bring my own craft and eye and sense to a project. And even if it's in someone else's home, it can still be mine. **EHT**

Mark Clement is a home-improvement contractor, co-host of "MyFixItUpLife" and author of The Carpenter's Notebook. Visit www.myfixituplife.com.

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I used the promise of some good food to entice my bachelor brother to come down and help me with a cabinet project. He somehow got the idea that there would also be a golf outing. He should have known better; we were embarking on a home improvement project, which involves some cool power tools, but very rarely the use of golf equipment.

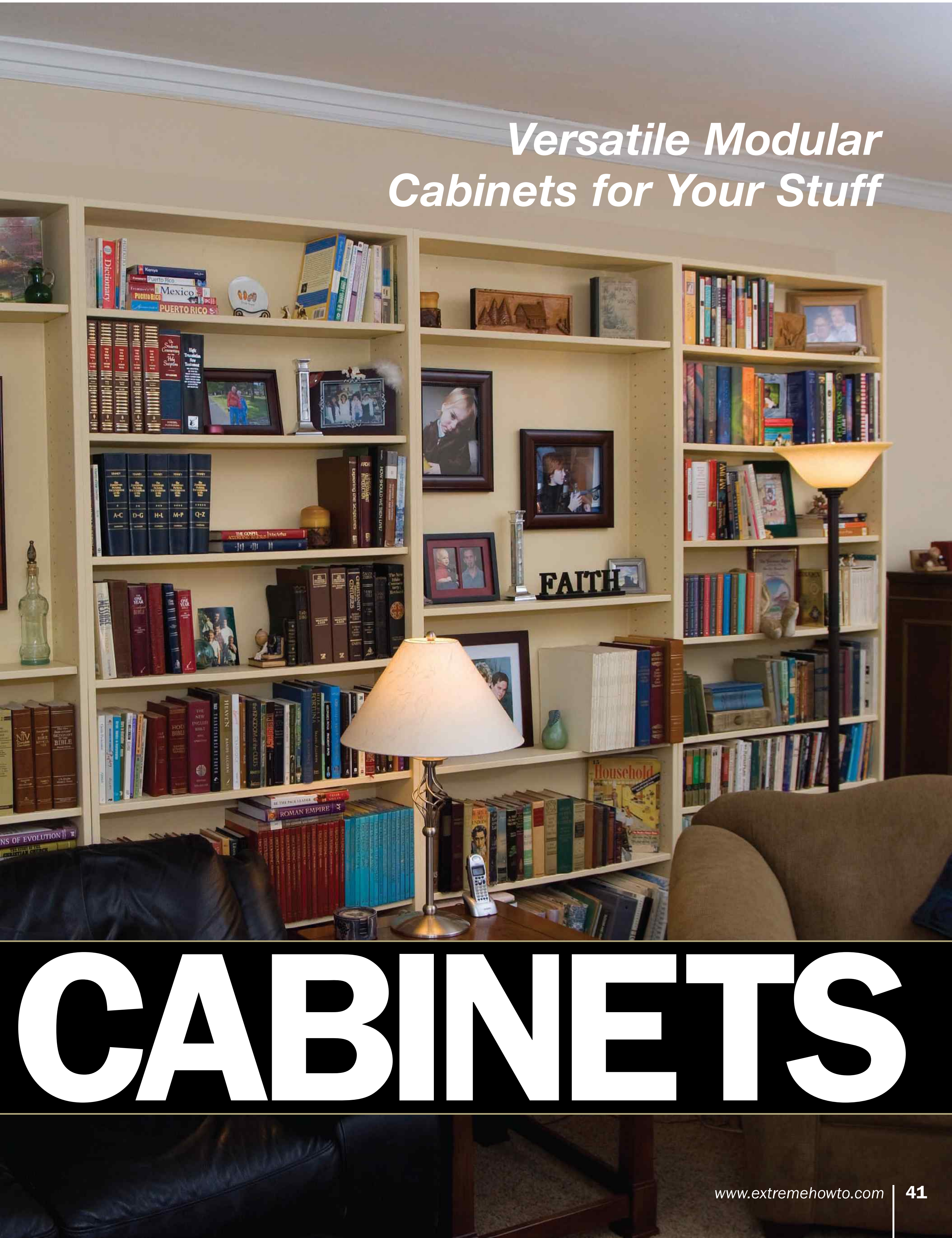
Before my brother, Chad, arrived I drew up a set of plans. It's important to have a detailed set of plans so you have something from which to deviate. Also, it helps to get your volunteers on the same page.

What the family needed was a way to store some of our stuff. The place we were moving into had a one-car, detached garage known in this area as a carriage house. Large double doors, in keeping with the historic district, were not conducive to daily use for car parking, so we planned to use the garage as a storage room.(It's one thing to begin piling stuff until you can't fit a car in the garage, but we planned to never park the car there in the first place.)

This project can also apply to those who want to add storage in one of multiple garage bays, sheds or any size room where you want to build closet and/or shelving space without building a closet. The design can be used for book shelves, food storage, wardrobe closets—you name it.

DIY STORAGE

By Larry Walton



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CABINETS

The biggest advantage to this project is that the cabinets are designed to be completely modular and portable. You can take them with you when you move or reconfigure them for use in different rooms as your needs change. In fact, as of this writing I'm planning to add a face frame and doors to one of the 24-inch units and use it in our bedroom as a wardrobe closet.

Taking time to sketch out your project helps to get everyone on the same page. Plans can also help you make the best use of your materials.

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With plan in hand, we were able to calculate the materials needed, which in our case turned out to be one heck of a lot of plywood. Good thing we have a family member working in the plywood industry. When drawing up plans, it's a good idea to sketch out a 4-by-8 sheet to scale and divide it up to represent parts (top, bottom, side, back, shelves) so you can see how to best use the material.

We wanted the vertical and horizontal dimensions of all of our cabinets to match, but with a variety of depths (12, 16 and 24 inches). In the end we made all of the units 32 inches wide by 84 inches tall. The 7-foot height would allow them to be used in rooms with 8-foot ceilings. It could be brought in and still tipped up with the toe kick removed. As for width, 32 inches would make a reasonable span for almost any weight of object we would store on the plywood shelves. We built five units that were 16 inches deep, two units that were 12 inches deep and two units that were 24 inches deep.

PROTOTYPE

Anytime you're going to build multiple units and especially when they share identical parts, it's a good idea to build a prototype early in the process. No matter how carefully you've planned, it's easy to miss some details.

One detail often missed is how the pieces overlap one another. In our case, we wanted the sides to overlap the top and the bottom of each cabinet to hide the veneer layers of the top (lid) and the bottom (floor). Because of this overlap, the tops and bottoms needed to be 1-1/2 inches shorter than the overall width of the cabinets.

Additionally, we wanted our cabinet backs to fit inside the box that made up the sides, the top and the bottom for the same veneer-hiding reason. This means

Most of the cuts for this project will be made on the table saw. Taking a 16" rip from a sheet of plywood leaves the 32" back panels needed for the cabinets.

A depth gauge makes holes for the shelf pegs while preventing the bit from going through the cabinet sides.

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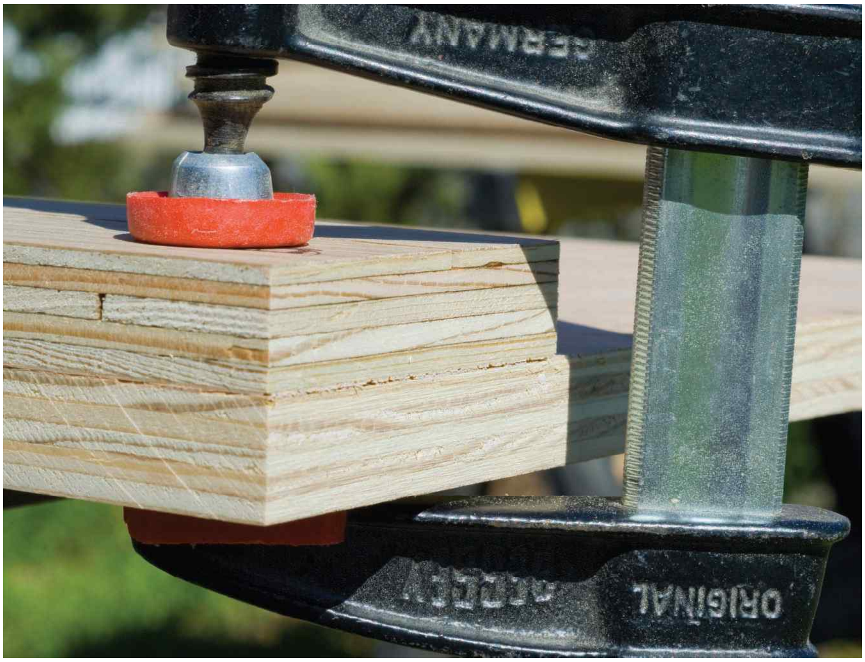
that the back panel piece is the same width as the top and bottom pieces but 1-1/2 inches shorter than the side pieces.

Our prototype build helped us see that the shelves themselves were each slightly shorter than the top and the bottom because you need room to move them in and out. Additionally, they needed to be a full inch narrower than the top and the bottom piece because of the room that's taken up by the back panel (3/4 inch) plus a desired 1/4-inch reveal (or set-back) to the front edge.

To avoid wasting material, we cut a foot off each sheet of plywood to make them 4-by-7 feet. By doing this initial cut, we were able to use the extra 1-by-4-foot pieces to make shelves and toe kicks. Had we started with



We used a clamp to hold our drill jig flush with the bottom of the cabinet side panels.

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full-length rips, we would have ended up with lots of little 12-by-12-, 16-by-12- and 24-by-12-inch scraps.

Unless you have a large commercial-grade table saw, you should cross-cut your plywood sheets with a circular saw. When using a circular saw on plywood, mark and cut the sheets from the back to avoid tear-out.

After cutting the 4-by-8 sheets to length, rip the various pieces to width. Flip the sheet of material end to end after two cuts so you're starting fresh with the factory edge. Pay attention to the condition of the materials as you cut your pieces. Once you've ripped a stack of 12-, 16- and 24-inch deep side pieces, you can cut your tops and bottoms out of this material.

JOB FOR A JIG

With all of the components cut for each of your cabinet units and before you nail them together into boxes, it's time to make a layout jig to drill for adjustable shelves. We used a strip of 3/4-inch plywood as the layout jig. Chad, my brother, cut a shallow kerf down the strip for an alignment guide. He then marked 2-inch increments but not all the way to the end. Start at least 6 inches away from the top and the bottom of your jig unless you have a reason to place a shelf very close to the top or bottom.

The hole spacing on the jig does not have to be precise because the jig will ensure that the four holes for each shelf position will match each other. As long as the jig and the

A shallow kerf cut on the drill jig helped line up the layout for the adjustable shelves.

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cabinet panel are flush when drilling, the holes will line up. Be sure to label the jig and the side panels, so when the cabinet is put together all of the holes will be spaced from the same starting point.

In addition to the layout jig for the hole spacing, Chad also made a depth gauge to fit on his drill bit. The depth gauge prevents you from drilling the holes all the way through the cabinet side panels. We sometimes use tape around the bit or mark it with a Sharpie. The important thing is that you drill deep enough for the shelf pegs, but not so deep as to exit the side of the cabinet panel.

With the side panels, tops, bottoms and back panels all cut to size and the side panels drilled for adjustable shelves, it was time to assemble the cabinet boxes. We did this by putting the back panels down on a flat surface and then arranging the sides and the tops around the outside of the back panel, paying particular attention to the direction of the side panels. I keep a little mantra running through my head to make sure the pieces overlap the right direction: "Verticals run by." We nailed

CONSIDER THE KERF

Consider the effects of the saw kerf when planning your cabinet sizes. If your plan calls for a cabinet that's 12 inches deep, that would mean four rips out of a 4-by-8 sheet of plywood, right? Well, not necessarily. Keep in mind that each time you make a 12-inch rip on the table saw, you're actually using up 12-3/16 inches because of the thickness of the teeth on the saw blade. By the time you get to that fourth piece, you may be 9/16 of an inch too narrow. So, make the depth of your cabinet pieces reflect the number of cuts that will be made out of a sheet of plywood. What you think of as being a 12-inch cabinet ends up being 11-3/4 inches net to accommodate for the saw kerf. Sometimes, however, the sheet goods are actually designed to allow for this type of cut. In our particular case, the plywood we had was actually 49 inches by 97 inches, which allowed us to go net 12, 16 and 24 inches for our cabinets.

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We arranged the cabinet parts around the back panel and nailed them together with the verticals overlapping the tops and bottoms.

through the sides into the top and through the sides into the bottom.

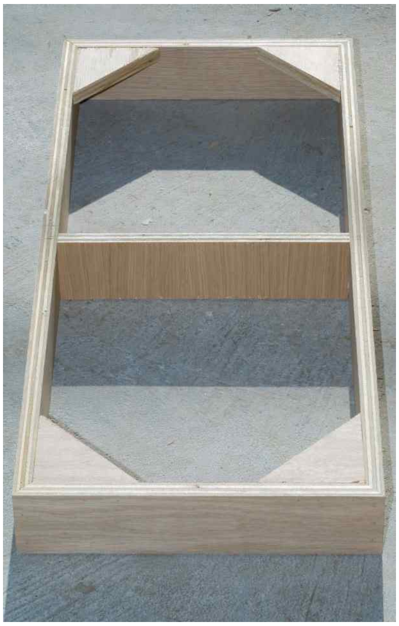
We tacked the back panels in a few locations and finished nailing them off after rolling the cabinet up on one side and then the other.

TOE KICKS AND GUSSETS

With the cabinet boxes all nailed together, it was time to turn our attention to the cabinet toe kicks. A toe kick can serve several different functions. First of all, it's designed to get the cabinet box up off of the floor, away from brooms, mops, vacuum cleaners and small toys. Second, the toe kick allows for a space to park your toes when you approach a countertop work space or sink.

Toe kicks, when left loose, can help in the cabinet installation process. In situations where you are installing in a blind corner the toe kick can be leveled, and when the cabinet box is placed it will also be level.

Separate toe kicks allow added maneuverability for bringing an



We made the toe kicks as boxes with mitered corners, triangle gussets and a center support.

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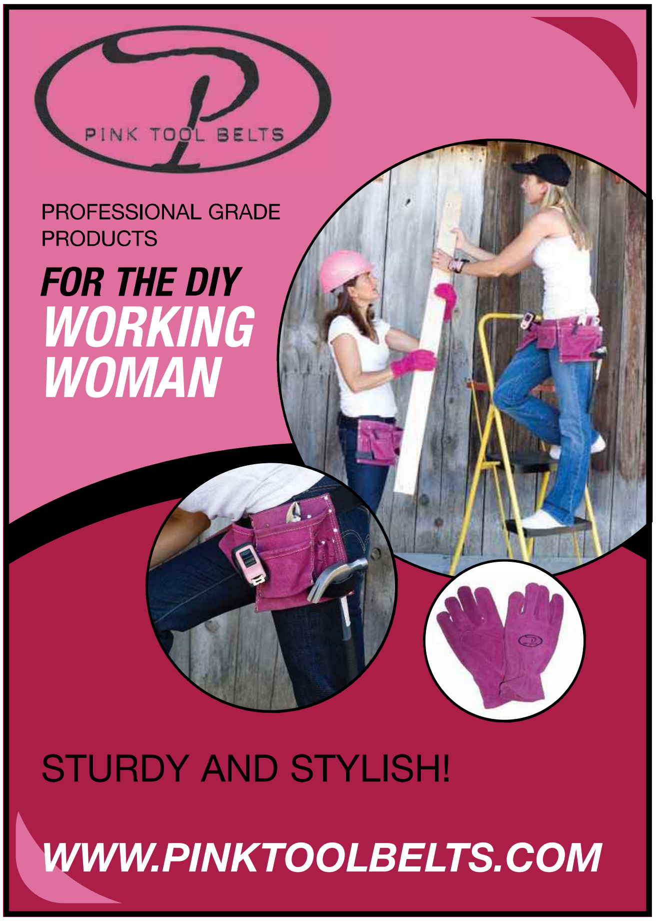

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odd-shaped cabinet into a house. A cabinet that is near ceiling height cannot be tipped into position with a toe kick. However, with the toe kick off, you can bring it in, stand it up and place it on the toe kick.

Some kitchen base cabinets can make it through the door only with the toe kick off. This is often the case with kitchen corner cabinets housing lazy susans.

When it comes to the construction of a toe kick, there are a couple size considerations. The height is usually about 3 inches, which allows enough room for toes to fit under. The toe kick must be shallower than the cabinet—3 inches of setback for base cabinets and less for shallow cabinets. A bookcase, for example, may be only 3/4-inch recessed to provide proper support.

We attached the toe kicks to the cabinets with screws through the gussets.

BACK PANEL ADVICE

It's much more common to use a thinner piece of material for a cabinet back panel for a couple of reasons. For example, thin plywood is less expensive and takes up less storage space on the interior of the cabinet.

However, there are advantages to using 3/4-inch thick material as the cabinet backs. Thick plywood eliminates the need to make rabbet cuts in the side, top and bottom panels. These are necessary for thin backs because they cannot be nailed through the edges. The thicker back panels allowed us to use the cabinets out in an open room as room dividers. Additionally, the use of 3/4-inch back panels meant we could eliminate cabinet strong-backs or cleats to anchor the cabinets to wall studs.

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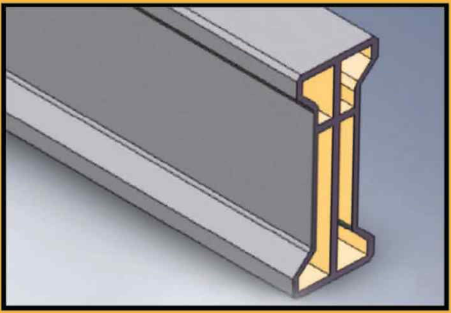

New chassis technology maintains accuracy and increases strength.

The width of a toe kick can be flush with the cabinet box but often looks better with a 1/4-inch reveal, which means it will be the cabinet width minus 1/2 inch. We used this 1/2-inch rule because we wanted the sidewalls of our toe kick to nearly line up with the sidewalls of the cabinets to give it the best structural strength.

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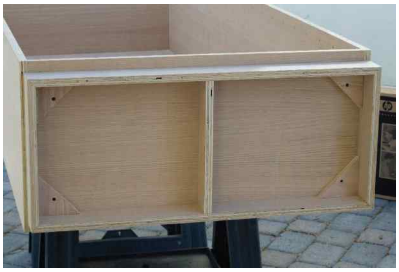

Toe kicks can be attached to the cabinets if ceiling height leaves room to tip the cabinet into place.

We mitered the corners of our toe kicks to hide the veneer layers of the plywood.

After building a prototype, we were ready to cut the toe kick parts in multiples, including triangle gussets to square corners and provide an anchor for attaching the toe kicks to cabinets. With the pieces cut, we nailed them together in an assembly-line fashion.

We used our power planer to clean up the edge band material between rips.

We glued and nailed 1/4" strips of hardwood to the edges of one of cabinet boxes. The shelves for this cabinet received the same treatment along the exposed edge.

Cutting multiple matching pieces can speed the process of cabinet construction.

We used a drill bit with a built-in countersink to pre-drill a single hole in the middle of each one of the triangle gussets for all of the toe kicks. Because all of our cabinets had plenty of ceiling clearance, we were able to attach all of the toe kicks to the cabinet boxes. The toe kicks can be removed if we ever want to install them in an 8-foot ceiling location.

With the cabinet boxes all built, we cut the shelves. The shelves for the cabinets end up being slightly shorter than the top and bottom pieces for the cabinet boxes, and about an inch narrower than the top and bottom pieces. As always it's a good idea to go ahead and cut one sample shelf and actually try it in position on the cabinet, with the cabinet shelf pegs in position to make sure that you have the clearance you need. If it's too tight, then it's hard to get in position and you can scratch up the inside of the cabinet box,

EDGE BANDING

Because most of our cabinets were in a garage application with no doors, we decided not to face-frame the cabinets at this time. We did have one cabinet slated for inside the house. Since this cabinet was not going to have doors, we decided to use matching hardwood strips to edge-band the front faces of the cabinet box and the shelves rather than building a face frame. We ripped strips on the table saw, cutting them to length, gluing them and nailing them into position. After each rip, we jointed the board with the power planer before making another rip. A full-sized jointer is the best tool for this operation.

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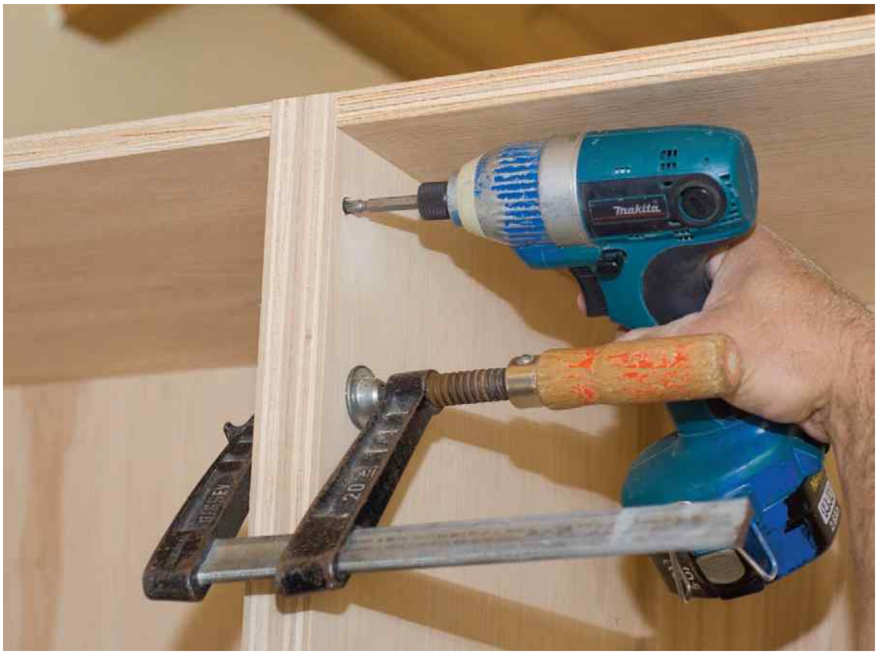

Cabinets can be configured side by side. We used clamps to hold the faces flush while screwing the cabinets together.

possibly damaging the surface of the shelf. If it's too short, then you'll have too much gap between the shelf and the cabinet walls with a potential of the shelf falling off the cabinet pegs.

GOT RODS?

We had two cabinet sizes that could be used for hanging clothes. The 16-inch deep cabinets function like partitions in a walk-in closet with the rod mounted 12 inches from the back. Another option is to use the 24-inch deep cabinets and make a full wardrobe with face frames and doors. Twenty-four inches is deep enough to hang clothes and have them be completely out of sight behind doors.

For now, we chose the 16-inch option to hang camo gear and

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winter coats in the carriage house. Either way, it's simply a matter of getting some closet rod cups and installing them (about 2 inches down from the ceiling of the cabinet and approximately 12 inches from the back of the cabinet). With the rod cups installed, measure from the inside of one cup to the other, cut the closet rod to length and put it in position.

Here's how our modular cabinets are currently deployed in the house:

Four of the cabinets are side-by-side and back to back to form a peninsula in the garage.

A second peninsula is made of two cabinets side by side with another forming an "L" at the end. This end cabinet stabilizes the narrow peninsula 16-inch cabinets.

Two of the cabinets are installed conventionally with backs against the wall.

One of them holds my golf clubs, which my brother says is wasted space if I never use them.

If you need to gain additional storage at your house, consider this modular cabinet approach.

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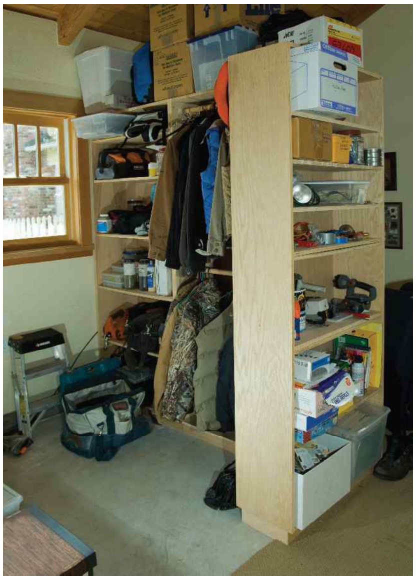

Three cabinets configured in a garage: Two 16" cabinets side by side with one 12" unit attached on the end. One of the cabinets has been outfitted with closet rods for hanging clothes.

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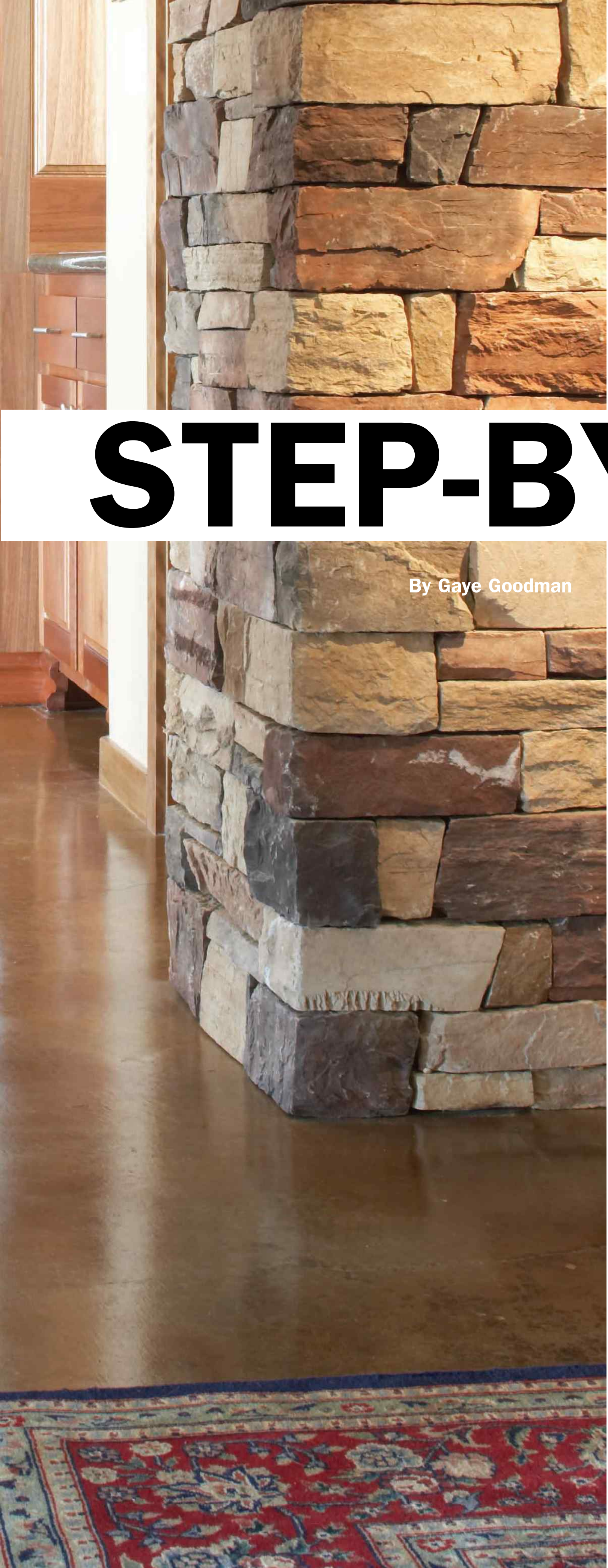

Master concrete stainer, Gaye Goodman, explains the staining procedure in step-by-step detail.

STEP-BY-STEP

By Gaye Goodman

This article will take you from beginning to end through a typical acid-staining job for concrete floors. We will first review the steps you must take before the crew gets to the jobsite, from how to best prepare and finish the slab, to the stain samples you will do months in advance. We will then go into some detail on the seven steps of acid staining once you're ready to begin the project.

EDUCATING YOUR CONTRACTOR

For acid-stained concrete, builders generally want to know how to best finish the new slab for you, when you would like to appear on the scene to do your work, and what sort of slab protection you recommend until that time. To simplify matters I devised a tear-sheet called "Warnings to Contractors," which follows:

1. Do not use any liquid curing compound! Anything oily or waxy completely blocks penetration of the acid stain.

2. Use normal, moderate troweling. Do not allow burnishing with metal trowels.

3. If possible, avoid use of a power troweling machine. If the slab is too smooth, the pores are closed and staining becomes spotty. A "garage floor finish" gives us just the right amount of tooth in the slab for attractive acid staining.

4. We advise against using concrete with short reinforcing fibers. The slab ends up looking a bit “hairy,” usually in clumps.

5. You will need to protect the slab from tar and paint spots. For new concrete, let the slab cure for at least two weeks, then lay down plastic.

6. When covering the slab, do not use sticky tape to hold the covering down. This leaves dark, blocky marks in the concrete, which are permanent.

7. Avoid framer’s markings, such as red framer’s chalk or crayon, which seems to be completely permanent and can show through the translucent stain.

8. It’s best to stain the floor after the walls are painted but before toilets, kitchen cabinets, interior doors and baseboards are installed.

9. The acid stain can be wicked up and turn wood black, so it is good to have wood door frames painted or sealed before floor staining begins.

WHERE TO GET STAIN AND SEALERS

True acid stains, which do the best job of enhancing the slab, are completely translucent. One can see all the curing anomalies in the slab right through the stain, so the result looks truly like a stone or marble floor. True acid stains are not purchased at a paint store or hardware store. Due to the acid content in the stain they are considered “hazardous materials” for shipping purposes. They are also fairly tricky to use, so retail stores do not want to deal with problems caused by amateurs using the product. You will need to go to a Concrete Equipment and Supplies Store to buy the stains. These stores have the HAZMAT rating necessary to ship and deal with such stains. Concrete stores are used to dealing with professional contractors; although some will not sell stain to the general public, most of them will.

There are now hybrid stains sold at a few paint and hardware

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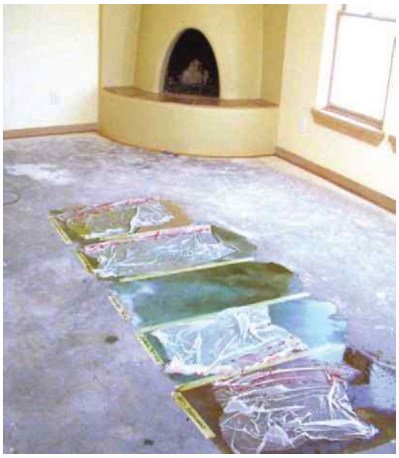


Stain samples are shown in a bedroom which is slated to receive carpet. The plastic is a texturing device used with some colors.

stores, which contain some acid and metallic salts that react with the slab, but also some pigment colors (which are opaque and conceal the beauty of the concrete). You may find these satisfactory, although the instructions in this article apply to true acid stains.

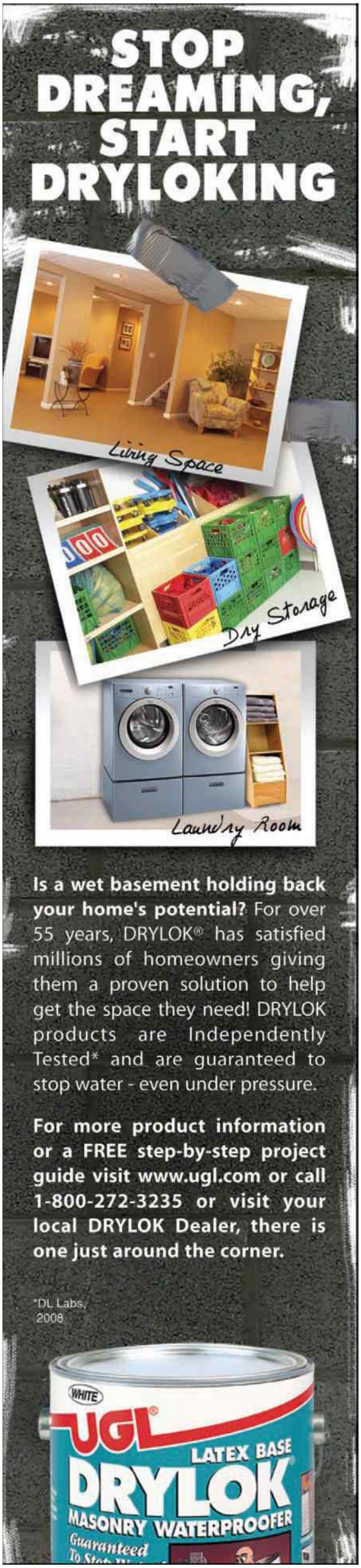
Real acid stains only come in eight or ten colors—and most of those are browns or blue-greens. If your retailer hands you a color chart with a far greater range of bright primary colors, you can be sure he is trying to sell what I call a "hybrid stain."

While at your local concrete supply store, ask what clear sealers they sell to apply over acid-stained concrete. These will either be odor-free, water-based acrylics or the more durable and deep-looking solvent-based acrylics. Never use an epoxy or polyurethane on stained concrete floors. Most of them do not "breathe," and that can be catastrophic. It is important that the brand and type of sealer matches the climate where you live. It does not need to be produced by the same manufacturer who made your acid stain. Therefore, while you might find a place on the web that can ship some real acid stains to your home, you should not order your sealer online. In some very humid climates, such as Houston, Texas, or New Orleans, a water-based acrylic cannot be used at all, since it will not cure properly. (More on sealers later.)

THE COLOR SAMPLE

One concrete slab may look a great deal like another, but you must never be tempted to skip doing color samples. Stain sample results can vary widely from those on the color chart of the stain manufacturer. Color samples allow you to assess the character of your slab. Each slab is different, and will react differently to stain.

To create a sample template, divide the area into sections using masking tape, label them, and clean inside the boxes. This will allow you to test various elements of your stain: color, color mixture, manner of application, and laid-on textures. Pour stain on one of the sample areas; quickly brush it around. There should be fizzing when the stain hits the slab. You will need to give the stain samples four hours to develop, and then return to the jobsite to scrub stain residue from the surface, rinse it off, and check the colors and patterns. If the slab is strongly reactive and all your colors seem too dark, you can perform some more samples with diluted stain. We often use a ten-to-one water to acid solution to dilute our stain. Some stain companies manufacture a "stain extender" that comes in gallon bottles. We have found that using extender to dilute our stain can make it flow and etch the color more evenly than our homemade



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*DL Labs, 2008

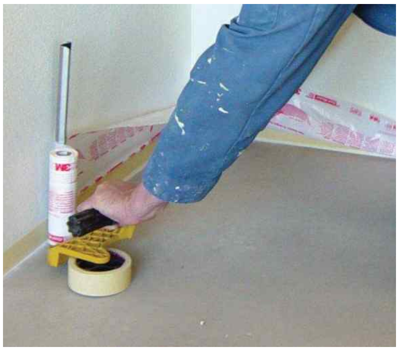
dilutions, particularly with dark colors.

Note that many slabs are power-troweled, which does not make them impervious to stain, but they will be slick. If parts of the slab appear charcoal gray and have sheen when you look across them, you can be fairly certain that the finish has been "burned in" by too much troweling. This makes the stain roll off the high places, causing a spotty look. Such a slab needs to be well sanded or acid-washed prior to staining.

MASKING WALLS AND WOODWORK

Before cleaning the slab, carefully mask off every surface contiguous to the stain area with plastic sheeting and a high-quality painter's tape. Acid is a corrosive and invasive compound. It will affect almost any surface it touches, and walls and woodwork are especially susceptible. Acid, and the metallic salts which make it stain well, will turn wood black, corrode metal, and even stain porcelain. (If your walls are accidentally stained, cover these spots with a lacquer-based, stain-blocking primer like Kilz before repainting.)

Plaster walls require a bit more prep than drywall. These walls are best protected when they have been finished with their topcoat and sealed with an invisible waterproof sealer. If you have any doubt about the resistance of any surface to the acid stain, then mask it.



Over a layer of medium-tack masking tape close to the floor, a masking machine applies tape and thin plastic, which is then unfolded up the wall to a height of 2 feet and tacked into place.

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CLEANING THE SLAB

I can't stress enough how important it is to thoroughly clean the slab before staining. The condition of the slab is so vital that I estimate wall masking and floor preparation to be 80 percent of the labor of staining. Any spot of paint, tar or mastic left on the slab will mar your stain finish.

To clean the slab after masking, first scrape away any drywall mud from the slab and vacuum up debris. Use TSP (TriSodium Phosphate, sold in the paint department at hardware stores). Use about 2 Tablespoons of liquid TSP or TSP Substitute to 4 gallons of water to power-scrub the entire floor, using a power rotary floor buffer fitted with a coarse black pad. Rinse well. Do corners and edges by hand. If plaster residue or latex paint is spotting the slab, it will be necessary to soak these sections for 40 minutes, then power-scrub. Follow the power scrubber with a wet-dry vacuum, and mop behind the vacuum with clean rinse water. A newer type of mop made with tubes of microfiber fabric sold at janitorial supply stores will work twice as well as the old type of string mop. Work small areas at a time, otherwise concrete slurry is likely to dry before you get to it. Dried slurry will show through the stain.

If your first TSP scrub reveals spots of white paint or black tar on the floor, scrape them up with a 3-inch wide razor scraper and clean off the residue with a bit of lacquer thinner or xylene rubbed on with a rag. Wear chemical gloves and a mask for this part; most smelly solvents are carcinogenic. (Even if there is enamel or oil-based paint on the slab, do not try to use paint thinner. It doesn't work well and leaves an oily residue on the slab.) You want nothing oily or waxy on your clean slab, since the acid stain will roll away from those spots. TSP is great for cutting through oily spots.

FILLING HOLES AND CRACKS

Once you have properly cleared the debris and power-scrubbed the slab, you can move on to filling holes and cracks. It's fairly easy to judge what needs to be filled—anything wide enough to hold a credit card. Hairline cracks are of no concern; they add to the overall interest of the surface.

First, remove any "islands" and loose particles from the crack, using a cold chisel. You want to create a void within the crack to allow proper filling. Vacuum the crack. Inject concrete glue into the crack, wiping up any excess. Wait about 30 minutes for the glue to set up.

Mix a cementitious floor topping compound, which comes in dry form from your concrete supply store, to a "heavy cream" consistency by adding water, and then press it into the crack with a spatula. When the filler has dried, scrape off the high spots, and sand along the crack with a drywaller's sanding screen.

Note that our staining company does not use products that are sold as patching compounds, because they are generally too sandy and rough. Most patching products sold at home-improvement stores will create a texture that is obviously at variance with

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the rest of the slab. Also, do not use latex or acrylic to fill cracks; it will not accept stain.

If filled areas are extensive across the floor, it may be necessary to scrub and rinse the entire slab again, with the rotary floor buffer and a red (medium) pad. If filled areas are infrequent, residue can be scrubbed from the sides of the cracks by hand with a piece of plastic steel wool and some water, sponging up the filler when it is still in suspension. Filler should only be seen in the cracks and holes and not as a wide dusty swath surrounding the repair, as it will take the stain color differently. Most fillers accept stain but look much lighter than the rest of the floor. They often need to be touched up later on with artist's acrylic paints mixed to match the surrounding floor.

A worker sprays a heavy coat of stain on a cleaned and dry floor. This living room reacted strongly and required only one application of stain.

FINALLY, THE STAINING

The method of application depends on the look you want. If you want an evenly stained, "leather" look, you will need to apply stain with a sprayer. We use a pump-up garden sprayer. Filter the stain through a paint strainer as it goes into the tank. Otherwise, small particles can clog the spray tip and lead to a very spotty stain job. The sprayer should be set to a fine mist. Be sure to buy a sprayer that has all-plastic parts. Any metal parts in a sprayer will quickly corrode from the acid, and a metal tank may even explode!

When the floor is dry enough to walk across, you will need to spray again, and perhaps a third time. Eventually, the spray speckles will integrate into a uniform looking floor color. If you are spraying a very reactive slab, you might first have to dampen the floor with a well wrung mop. The spray speckles will spread and even out on a damp floor.

Acid stain can also be applied by pouring. Staining this way is definitely a two-person job. If you pour on the stain, be sure that one worker prepares a wet spot of water on the slab into which the second worker pours the stain. Otherwise you will have a darker spot where the fresh stain sat and reacted before you could spread it out. The pouring technique uses more stain than spraying, but gives a marbled look that we find quite interesting.

If texturing devices are being laid into the wet stain, a third worker should be on hand to accomplish that. Whether you are laying down "veins and rags," thin plastic, or alfalfa or straw soaked in a darker color, nothing will make a mark if the floor is already dry.

Before loading all of your tools and buckets onto the slab, get a small cart—a child's wagon will do. Use this to shuttle your buckets and tools around the slab; the bottoms of buckets and stain bottles can leave rings on the prepared floor. We use one rolling cart for our stain implements and another cart that holds a five-gallon bucket half full of water. This is where we place the staining brush during pauses. Each person in your crew will need a respirator fitted with a cartridge rated for inorganic gases, specifically for chlorine-type gas, which is a byproduct of the staining process. They will also need skin and eye protection.

To begin staining, the first person applies a damp spot of water using the staining brush, and then stands aside, while a second worker pours stain in a puddle on the damp spot. The stain should be spread out immediately (use a professional quality, plastic-bristled brush with bristles of medium stiffness), using a circular, or figure eight, motion. You should see some fizzing, which is the chemical reaction. After one section of floor has been stained, a third worker may lay texturing elements down while the stain is still wet. This worker is often assigned to detailing as well.

Use a small China bristle brush to paint stain into saw cuts, corners and around doorframes. Some colors may be mixed right on the floor, while others can be mixed in the bottle. Keep in mind that blues and greens are the most fragile colors. They should be applied first. If the color is too intense, you can cancel out blue or green with a spray of brown. (Test first—some strong blue colors will "erase" the dark walnut brown colors).

Be careful not to overwork the stain, and do not spread it too far. Pour new stain for each new area. Scrubbing already-reacted stain onto a fresh gray area will leave visible brush marks at the end of the staining job. If you are working with large saw-cut squares, we recommend you work square-by-square.

On a slab without saw cuts, stain contiguous areas of about 12 square feet, and apply an edge of water around areas already stained. Work your way around the floor in a fish-scale pattern. You want to avoid working in rectangles—overlaps or seams could result in an unnatural grid effect. Be sure the stain you are applying in section B overlaps the water border you put down around section A.

Stain needs a full four hours to react properly, so be patient. At the end of the dry time, you may notice some pale spots where the floor is either high or slick. This is bound to happen, but it's very hard to determine where, and on which floors. We find that some pulling away of stain usually happens near wall edges. To restain these areas, use a plastic spray bottle filled with stain and spray them about 45 minutes before scrubbing. Second stainings seem to "take" more rapidly than initial applications.

You can also use this as an opportunity to add color accents to the gray (high) spots in the floor. Just be sure that the accent color isn't too much darker than the original base color. For a brown floor with subtle accents of green, we apply the green to the high spots with a sprayer the next morning when we can see where the stain has rolled away.

If the stain is blotchy across all the floor, the entire slab should be stained again to even out the surface. The second staining should be done by sprayer. We have to re-stain the entire floor about 60 percent of the time.

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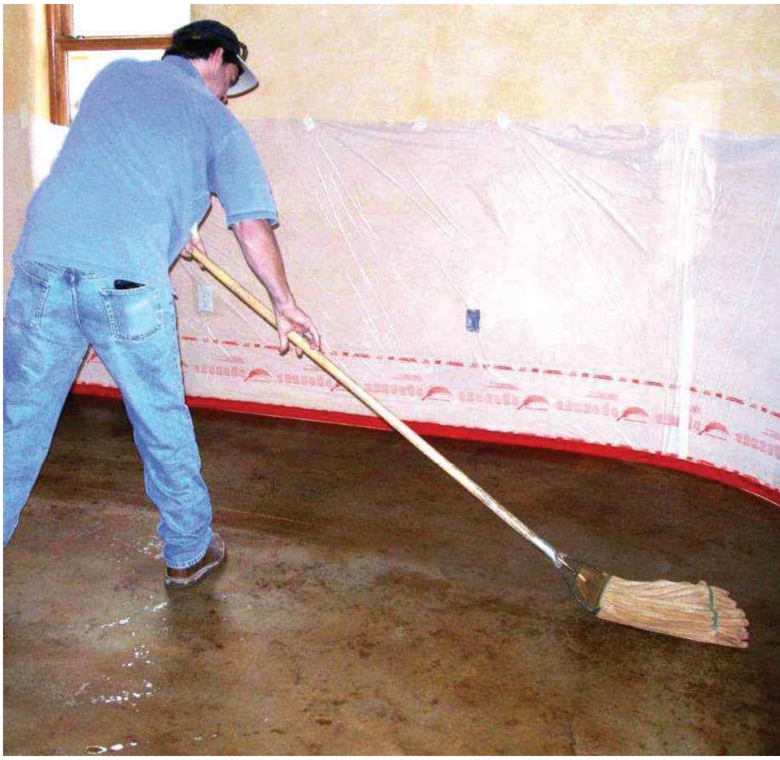
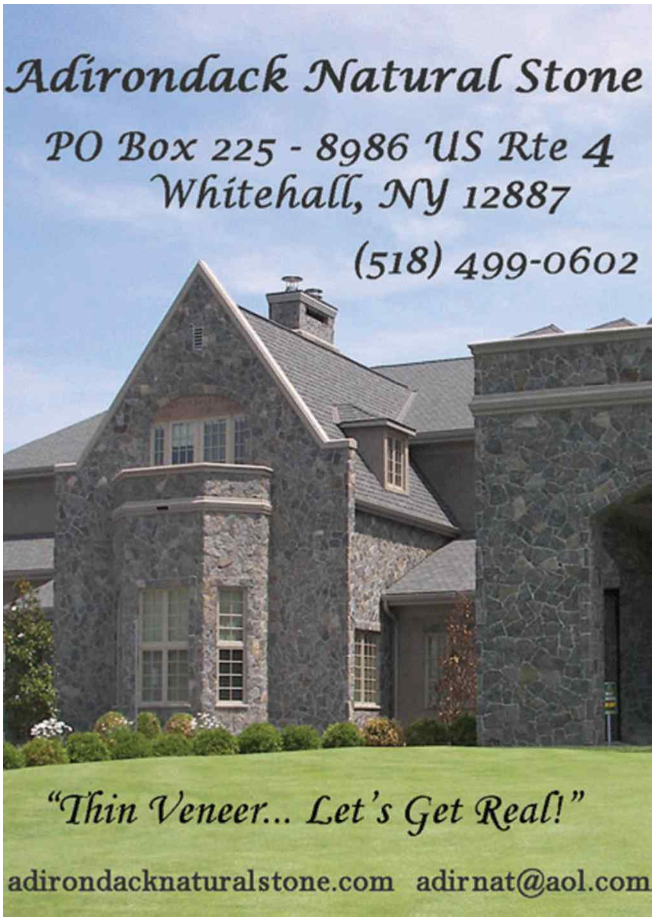
SCRUBBING AFTER STAINING

After allowing four hours for the stain to react with the concrete, the post-stain scrub is another three-person job, and is similar to the primary cleaning. The difference is that during this scrub you should use a soft (white) buffing pad and a small amount of pH-neutral floor detergent instead of TSP.

Washing the stain will reactivate it. Be sure all masking is still in place, and wear protective gear. Closely following the scrubber, use a wet-dry vacuum and follow that immediately with a rinse mop. It is important to get in corners and rinse well. Any cloudy chemical “dust” left on the surface may damage the adherence of the clear sealer or show up beneath it. Most stain



A worker uses a microfiber mop for final rinsing during the post-stain scrub.



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manufacturers recommend that baking soda or mild ammonia be added to the final rinse water to "neutralize" the acidity of the slab. In over a decade of floor staining, my company has never used anything but a janitorial detergent labeled "pH-neutral," and we suffered no ill effects from this. We feel that the concrete slab is so alkaline to begin with that staining with acid and scrubbing renders it neutral.

It is a simple matter to neutralize the acid staining residue in your vacuum: You add baking soda, TSP or washing soda (all caustic bases) in small amounts and let them dissolve in the residue. Some stain manufacturers say that the residue from acid staining is nontoxic. However, in some parts of the country where controls are

Solvent-based sealer is applied with a durable roller. A solvent sealer will darken the stain color and hold it at its "wet" look.

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rigorous, you will have to dispose of the stain residue by pouring it into a homemade "evaporation pond" made of black plastic lining a 2-by-4 framework and then depositing it in a toxic waste dump once most of the water has evaporated.

SEALING THE SLAB

Acid-stained concrete must be sealed to be durable, glossy, spot-resistant and easy to maintain. Most stain manufacturers make a sealer that they feel is best to use over their stain. The durability of water-based acrylic sealers is not as high as that of solvent-based acrylics, but there

KEEP IT LOOKING NEW

As with any flooring surface, proper care is necessary to maintain a fresh appearance for stained concrete floors. What follows is a list of some maintenance warnings about waxed concrete floors.

- **Never apply masking tape or other sticky tape to your floors as it can remove all coatings and some of the stain.**
- **Never lay plastic or acrylic mats or air mattresses on your floors. The final finish can bond to acrylic or plastic materials and be pulled up by them when they are later lifted away.**
- **Do not apply final finish if your floors are colder than 50 degrees Fahrenheit; the finish will fail, turning to a white powder and ruining the sealer beneath it. The floor should be completely dry when you begin application.**
- **Never use ammonia, bleach, or extremely hot water to clean your floors as they can have a clouding effect on the final finish. Tepid water on a mop is good for most jobs. Use a pH-neutral detergent, found at janitorial supply stores.**
- **Do not apply silicone dusting sprays to the floors since silicone will repel the next coat of final finish. If you are unsure, read the label before applying the product to your stained floors.**

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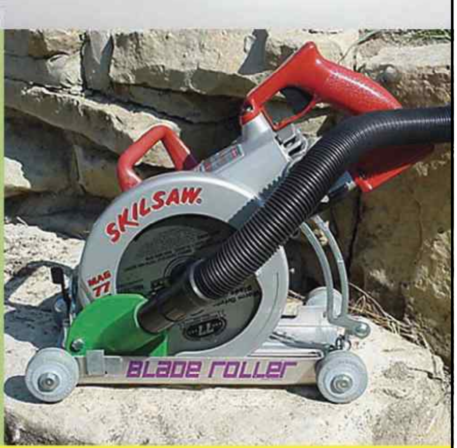

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is a trade-off with toxicity. In general, we use water-based clear acrylic sealers for residential use and solvent-based acrylic sealers (more scratch-resistant) in commercial areas where very high traffic is anticipated. Solvent-based sealers are not only more hazardous, and can cause lung and liver damage, but application requires equipment such as a respirator rated for organic compounds, a phenolic-core paint roller, it and takes 36 to 48 hours to "gas off" before you can apply a water-based final finish. For this reason, we generally recommend the use of only water-based sealers for DIY applications, leaving solvent sealers to the professionals. For more information on solvent-based sealers, visit www.gayegoodman.com.

The stained slab must be clean, dry and at least 40 degrees Fahrenheit in order to be sealed. Before you start, be sure joints and cracks are dry. For residences we often use two coats of Scofield's Cementone Clear Sealer with two coats of Terra Glaze Final Finish by Spartan Chemical Company on top of it. A sealer alone is susceptible to scratching.

Never use a polyurethane sealer made for wood floors; wood floors do not respire water for years the way a new concrete slab does. The hydrostatic pressure from water in a slab will bubble and lift any urethane, epoxy or paint product which forms a solid film on the surface. That is why, when you look at nice enamel-painted concrete a year later, it is almost always flaking. Your clear sealer must be semi-permeable—it must "breathe."

Water-based sealers are applied with a lambswool applicator, a microfiber mop, or a rayon string mop. Be sure to get the proper instructions and applicators for your type of sealer from your dealer.

To go along walls, or around toilets and cabinet edges, use a china bristle brush dipped into a smaller container of sealer. Since it is often difficult to get very close to walls and around toilets with the normal applicators, someone has to be willing to get on their hands and kneepads with a small brush and do all these areas by hand, first.

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Once your concrete has been stained, cleaned and sealed, it is not usually possible to improve problem areas by a reapplication of stain. The stain will not successfully penetrate unless all sealer is removed chemically. In some instances, touch-ups with artist's acrylic paints will be the best way to conceal certain unavoidable blemishes. These touch-ups are best performed by an artist familiar with faux painting and color matching. They are performed over the first coat of cured sealer so that the background color is known and can be matched. Subsequent coatings of sealer or wax may then be applied to protect the acrylic touch-ups themselves.

Once staining and sealing are complete, you may want to protect the slab if further work by other trades is scheduled on the property. Protect the floors with rosin paper, applying tape only to the paper itself

A water-based sealer will hold the stain color close to its "dry" shade, although it will be shiny.

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and never onto the stained surface. (Masking tape will remove both the sealant and the stain it has bonded with once it is torn away.)

"WAXING" THE FLOOR

We use acrylic janitorial final finishes as an added layer of protection on all floors that we have sealed. I still refer to janitorial top coatings for floors as "waxes," but I do so only to distinguish between them and the two coats of acrylic sealer beneath.

Janitorial floor finishes no longer contain petroleum-based or true natural waxes and do not require buffing. A janitorial quality final finish is a water-based acrylic coating quite similar to the acrylic sealers made for acid-stained floors, but usually glossier and more scratch-resistant. These add extra depth and protection to the floors, they are fairly easy to purchase locally for continued maintenance, and there are wax-strippers that can be used to remove them, if it should become necessary.

We frequently carry the floor staining process through two coats of sealer, let these dry, and then cover the entire floor with paper as a protection against all the finishing tradesmen who will be working over our floors. Once construction is fully complete, we return to remove the paper, vacuum and rinse the floors, dry them with fans, and apply two coats of janitorial final finish.

Wait until your sealer has cured overnight to apply final finish. A floor must be at least 50 degrees Fahrenheit to be waxed (even warmer than for sealing). The final finish is poured directly on the floor and then spread out with a flat microfiber applicator or a lambs-wool clamp applicator. Be sure that your applicator is dry. A wet applicator will cause many waxes to fail or streak. The final finish dries in about half an hour but continues to harden for three days, so it is best to delay heavy traffic on your new floors for three days.

You can apply a second coat as soon as the first coat is firm enough to be walked upon. The second coat of finish may be applied at right angles to the first; this way you're more likely

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This article appears in an abridged format, courtesy of master concrete stainer, Gaye Goodman. For more information on acid-stained concrete, visit. www.gayegoodman.com. Gaye's website contains a section on Preferred Suppliers with links to the products her company is currently using. This is handy, since stains and sealers are continually being upgraded and any article written today about specific products may become obsolete in a few months! **EHT**

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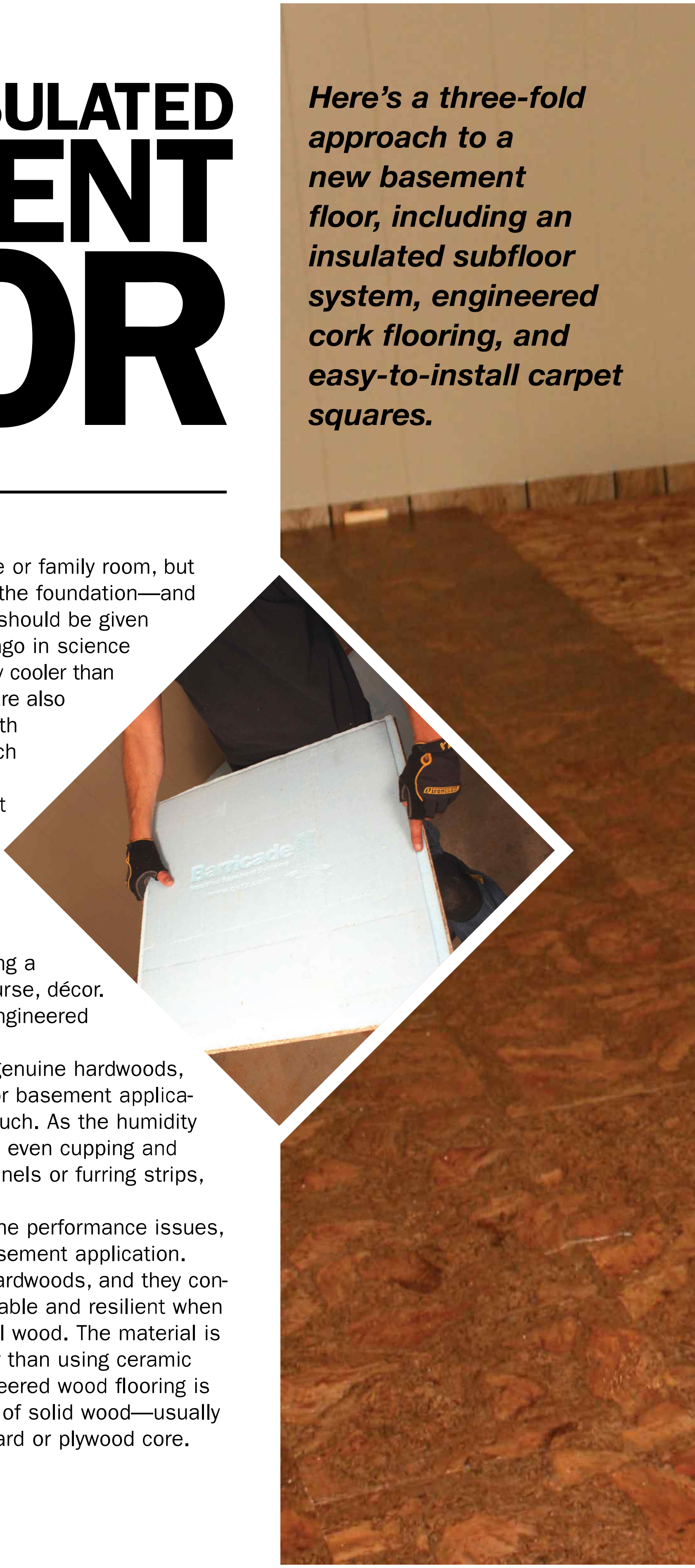
INSTALL AN INSULATED BASEMENT FLOOR

Here's a three-fold approach to a new basement floor, including an insulated subfloor system, engineered cork flooring, and easy-to-install carpet squares.

by Matt Weber



A finished basement can make a great office or family room, but by virtue of being the first living space on the foundation—and often below grade—special consideration should be given to the type of flooring used. You learned years ago in science class that heat rises, so basements are naturally cooler than the upper levels of a house. In many cases they are also completely or partially surrounded below the earth surface and sitting on a cool concrete slab, which has a tendency to transfer moisture. This story details a three-fold approach to a new basement floor, including an insulated subfloor system, engineered cork flooring, and easy-to-install carpet squares.

CHOICES IN BASEMENT FLOORING

Three critical issues to consider when choosing a basement include; moisture, warmth and, of course, décor. Basement floor options include tile, laminate, engineered wood and others.

Although you may love the look and value of genuine hardwoods, this type of flooring is generally frowned upon for basement applications because the humidity level changes too much. As the humidity changes, so can the hardwood, swelling, flexing, even cupping and warping. Some sort of subfloor, such as OSB panels or furring strips, is also required to fasten the boards over.

For the handsome look of hardwood without the performance issues, choose laminate or engineered flooring for a basement application. These products are less expensive than solid hardwoods, and they consist of an engineered wood core that is more stable and resilient when exposed to moisture than the linear grain of real wood. The material is more expensive than carpet but usually cheaper than using ceramic tile. The difference between laminate and engineered wood flooring is that the engineered version actually has a layer of solid wood—usually 1/8-inch thick—that is laminated to the fiberboard or plywood core.

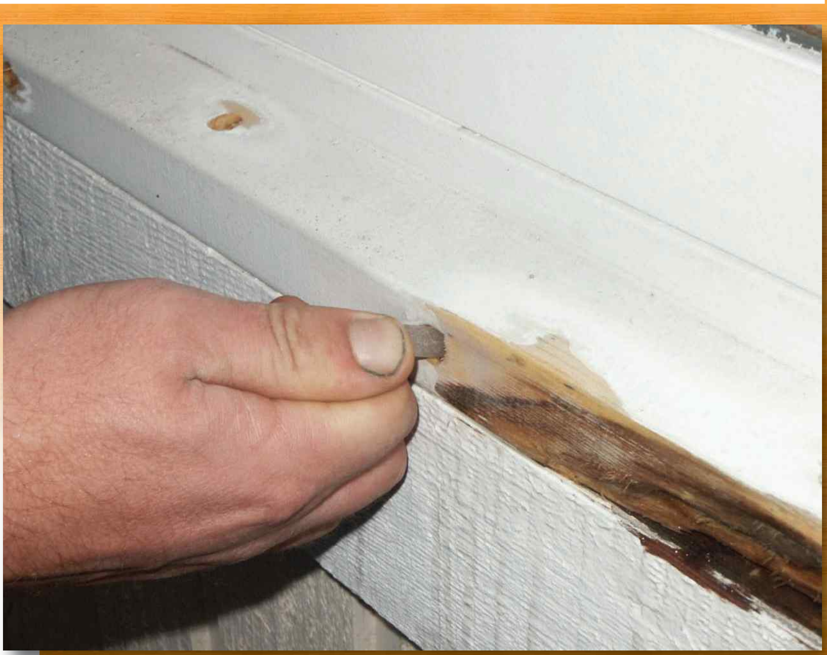
Both types of flooring are installed over a pad and “float,” meaning the floor adheres only to itself, usually with planks that lock together in a simple tongue-and-groove joint. The floor is not attached to any of the walls, which allows for expansion and contraction of the material as temperatures fluctuate.

As a finished surface, wall-to-wall style carpeting will be the warmest option, and some of the newest stain-repellent options do a great job of protecting the fabric. However, there are no stain-proof carpets and in a high-traffic family room, spills and other such accidents are bound to happen, and everything from bubblegum to rips in the rug can make a mess of carpet. Moisture is another enemy of carpet. In fact, we were replacing an old wall-to-wall rug in the basement because an unseen leak had soaked the carpet and resulted in mold growth.

Tile is another option for basements floors, and it offers a wide array of design options as well as the opportunity for creative installation using accents and border tiles. However, tile can be expensive and although some skillful DIY’ers can install it, it’s not nearly as easy a job as a tongue-and-groove option. Tile does a great job withstanding moisture, but it’s very chilly to the feet. Be prepared to always wear shoes on a tiled basement floor, or else consider installing a radiant heat system beneath the finished surface to add some extra underfoot comfort.

Some other things to consider include the plane of the foundation slab. The basement floor must be very level and smooth for proper laminate and engineered wood installation. Any dips or high spots will need to be filled, ground down or otherwise addressed with the installation of a subfloor. Additionally, ceiling height may be an issue, because installing a thicker floor will place people closer to overhead soffits and door frames.

Luckily, ceiling height wasn’t a concern with the basement shown in this article, but practically everything else was. After weighing these factors, we selected an insulated subfloor system from Ovrx, which reduces heat loss and moisture transfer from the basement slab, as well



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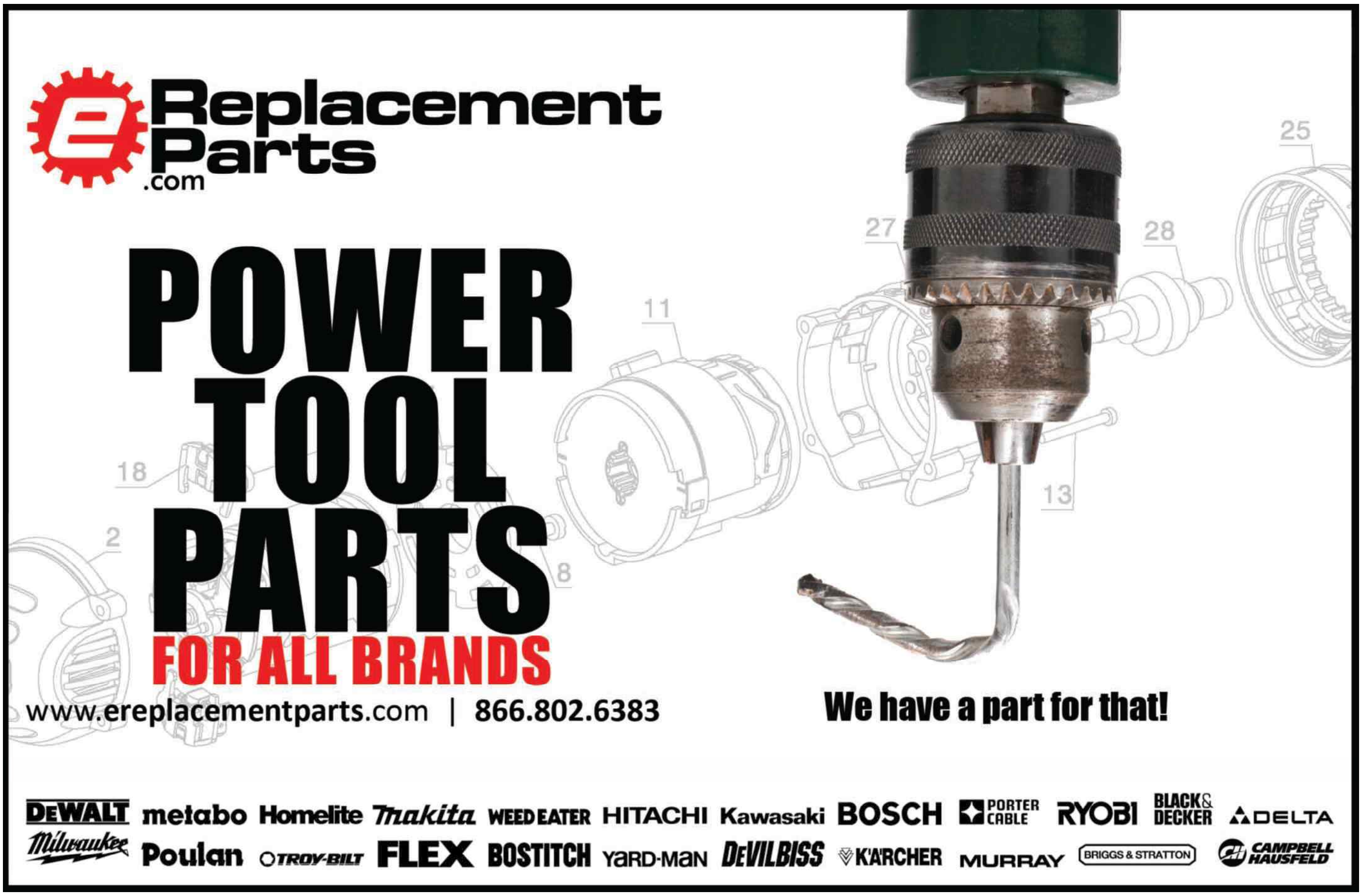
as creates a flat, level surface for the finished floor. We followed the subfloor with a layer of easy-to-install prefinished cork flooring from Lumber Liquidators, creating a resilient walking surface with a rich, natural appearance. Finally, we added a much-needed splash of color and underfoot warmth by making an accent rug from simple place-and-adhere carpet pads from Flor. Here's how the project unfolded.

INSULATED SUBFLOORING

Because concrete transfers moisture, you should never install carpet or wood directly over the bare slab of a basement; they'll ruin in no time. Tile, vinyl and linoleum flooring can transfer cold temperatures from the basement slab to the room. One solution to a dry, warm and comfortable basement floor is the Barricade Modular Subfloor from OvrX (www.ovrx.com), specifically designed to insulate concrete floors. The system comes in 2-by-2-foot panels that quickly and easily install using a tongue-and-groove system, and require no fastening or gluing. The OSB panels are 1.125-inch thick and backed with a layer of closed-cell polystyrene (Styrofoam) insulation, achieving an R value of 3.2 so walls feel as much as 15 degrees warmer. The recessed

Make sure the slab is level.

Start in a corner with a full panel.



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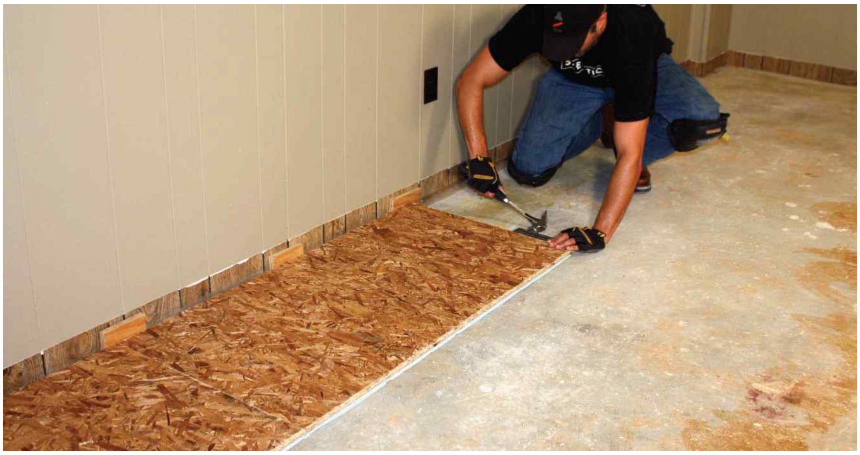


Join the tongue-and-groove subfloor panels with a hammer and block.

Slight dips in the floor can be shimmed with foam insulation.

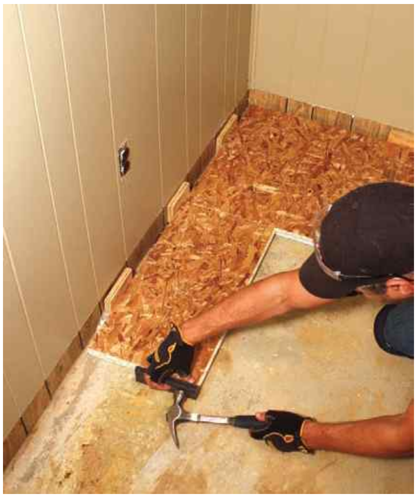
channels formed in the Styrofoam allow air to flow underneath the subfloor. The airspace functions as a layer of insulation between the cold, moist concrete and the finished floor. Plus, the panels are engineered to allow uniform expansion and contraction with changes in temperature and humidity. The system provides a protective barrier against air and water infiltration, intrusion from foundation leaks, sump pump failures and burst pipes, as well as extreme hot and cold temperature transfer through the floors.

The last panel of each row will probably have to be cut to size.

A table saw or handheld circ saw will work well for cutting the subfloor panels.

To install, first remove the old finished floor and any baseboards or floor trim. Prepare a level slab surface, and then lay a row of panels seam-to-seam, tapping together the tongue-and-groove joint with a hammer and wood block. I placed 3/8-inch plywood spacer blocks between the subfloor panels and the walls to allow for expansion. Slight dips in the floor can be shimmed with slips of scrap foam insulation (I used some old flooring underlayment that was laying around my workshop).

You'll probably have to cut the final panel to fit against the wall at the end of the row. You can then use the scrap piece to begin the second row. Alternate



Begin every other row of subflooring with a partial panel to stagger the joints.

A jigsaw can cut notches in the panels to fit obstructions.

A hammer and pull bar helps to install the last panel in a row.

the size of the first panel in each row from whole panel to partial panel, which staggers the tongue-and-groove joints for a stronger connection.

PREFINISHED CORK FLOORING

Cork flooring feels and looks much like the same cork that bottles your wine. It has a naturally organic cellular appearance and provides a cushioned, forgiving floor surface for a comfortable walkway. Cork is naturally durable and provides some extra acoustical and thermal insulation. The Lisbon Cork panels from Lumber Liquidators, shown here (www.lumberliquidators.com), come with a pre-applied finish that makes the surface resistant to moisture and easy to maintain.

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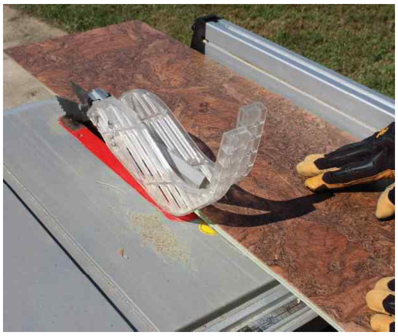
cork is the environmentally friendly nature of cork production. Cork is made by harvesting the outer bark of a Mediterranean tree called the Cork Oak that grows mainly in Portugal and Spain. The bark is stripped in such a way that it does not kill the tree. Only the bark is extracted, the tree stays alive, and a new layer of cork regrows, making it a renewable resource.


Rip the tongues off the cork panels where they meet the wall.

The Lisbon Cork floating floor should be laid on a clean, stable, flat, smooth and dry surface, and our subfloor system provided for this nicely. Without a subfloor, slopes of more than 1/4-inch over 6 feet must be leveled.

Cork features a natural cellular appearance with rich character.

You'll also need to lay a moisture barrier of 2-millimeter plastic sheeting before laying the boards, overlapping the seams by about 8 inches. With any sort of engineered tongue-and-groove floor, it's generally best to store the exposed planks indoors 48 hours before installing so they acclimate to the room's temperature.

Measure the room to calculate the width of the last row. If the last row will be less than 3 inches wide, then use a table saw to rip the planks of the first row to a narrower width, which will translate to a thicker width for the last row. Even if you keep a full-width first row, you should still rip off the exposed tongue of the first row. All exposed tongues should be removed from the perimeter of the wall, including

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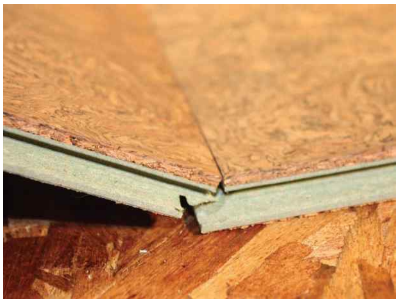


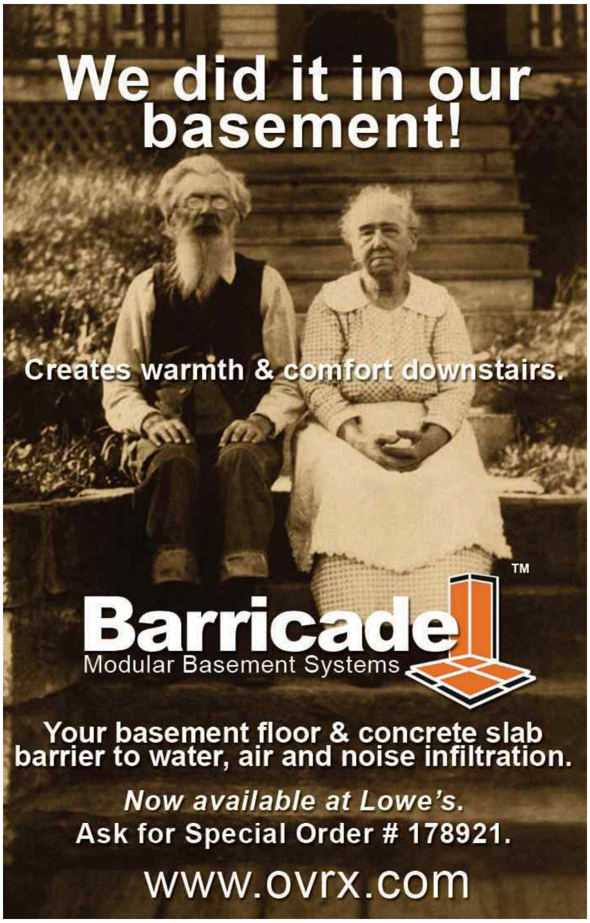
The tongue-and-groove joints of the cork floor connect easily.

The 1x3' size of the cork planks means the floor installs quickly because the larger the planks, the fewer there are to install.

the ends of the boards that begin each row.

Also, measure to determine if the walls are square. The walls in this basement were not, which meant I had to rip certain boards to a smaller width than others to follow a slight curve in the wall.

Start in one corner of the room and install the panels from left to right, with the tongue sides facing the walls. Place 3/8-inch spacers against the wall along the perimeter of the entire floor to allow for expansion. The joints of the panels connect in tongue-and-groove style, but unlike the subfloor, the cork panels must be tilted to insert the tongue into the other panel's mating groove. Join the long seam first, if possible. Tilt downward to pull the joint together, and then tap with a hammer and rubber block to lock it closed. Be careful with the block, because the soft cork material can be damaged by the hammer blows. Rather than hit the cork edge of the panel, use



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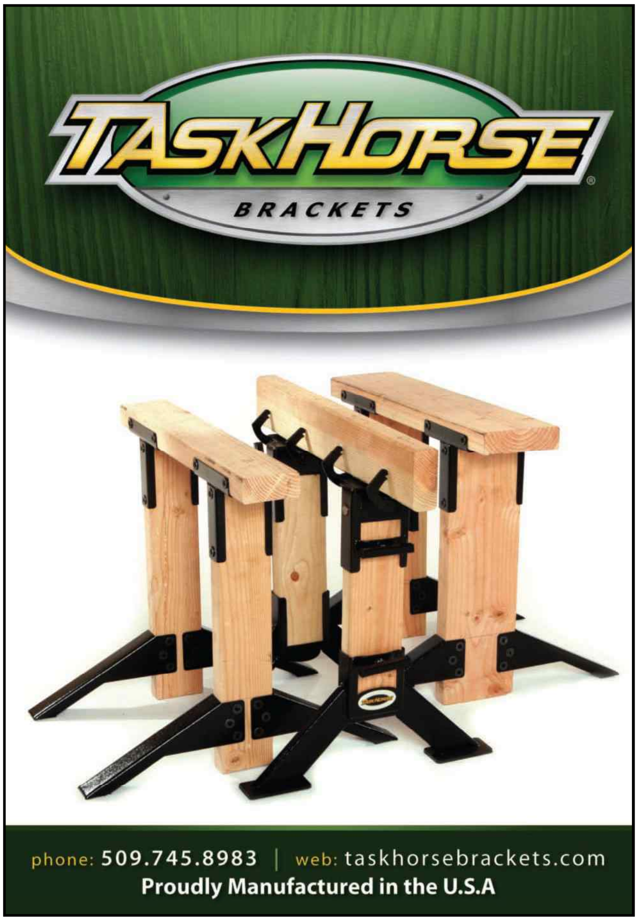

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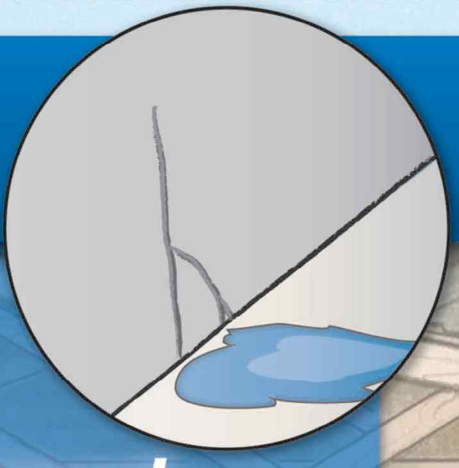

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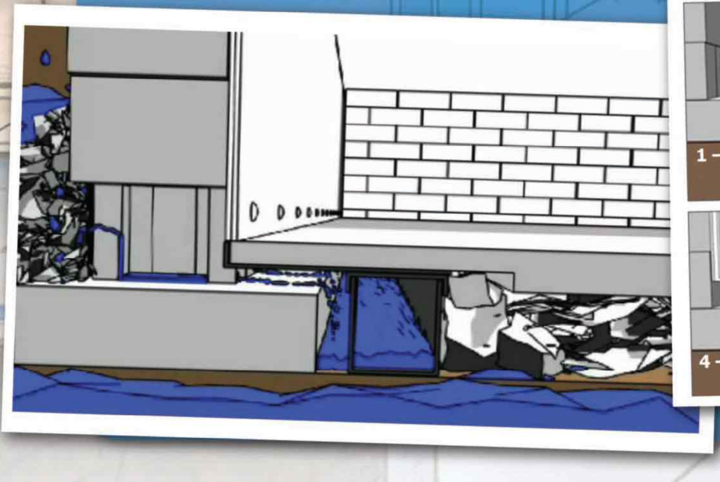

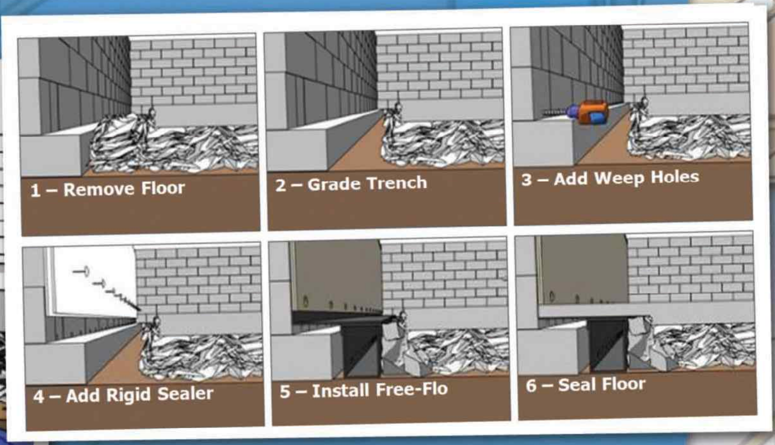

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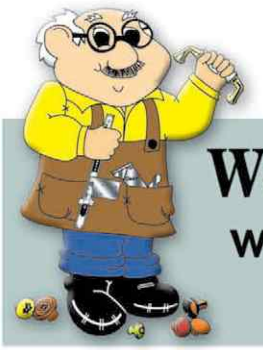

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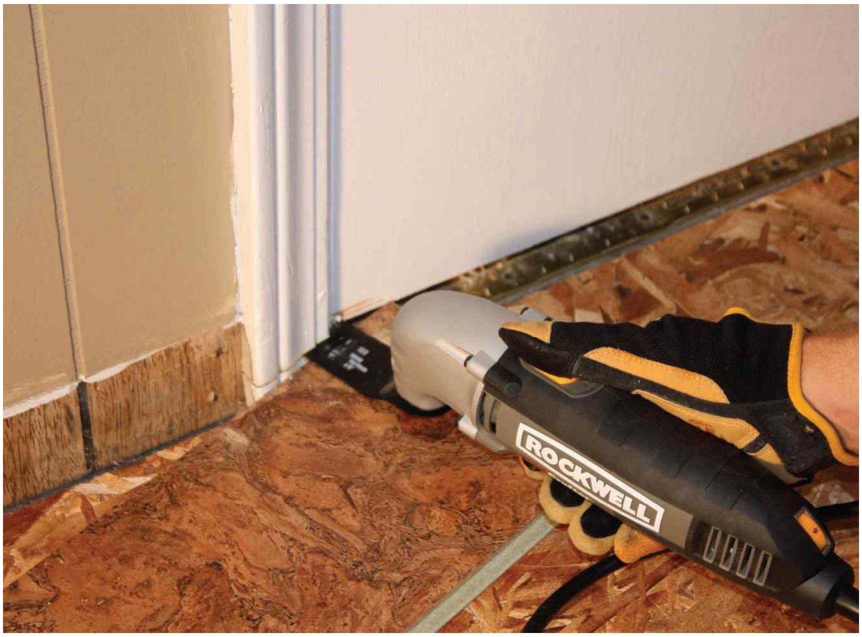

An oscillating tool like the Rockwell SoniCrafter makes quick work of undercutting door jambs to allow clearnace for the new floor.

The cork is easiest to install by connecting the long joints first.

A Lam-Hammer is even faster to use than a hammer and pull bar.

a notched block that misses the cork and only connects with the engineered wood core of the panel. A scrap block of mating cork flooring can also serve as a hammer block.

When beginning the second row, begin with a partial panel that staggers the joint at least six inches away from the preceding row. Repeat this pattern for the following rows so there is always a 6-inch minimum setback between the seams of adjoining rows. A table saw can make most of the rips and crosscuts, although a jigsaw is a handy tool for making small cuts and notches in the floor boards.

To pass pipes and other obstacles through the floor, use a pencil to trace the cut location. Find the center point and drill a hole slightly larger than the obstruction. Then, saw the panel in two parts so the cut passes through the center of the drilled hole. Install the floor panel one piece at a time, re-assembling it around the obstacle.

Occasionally, you'll have to undercut a door jamb; use a flush-cut saw, an oscillating tool or even a hammer and sharp wood chisel. Doors will also need to be trimmed, so pop them off a hinge and onto a couple of sawhorses. A handheld circ saw and a homemade saw guide work well for this.

Complete the field of the floor, ripping the last row to width and closing the final T&G joints by pulling the panels away from the wall with a hammer and pull bar or, even better, a Lam-hammer (www.lam-hammer.com). Floors larger than 27 feet will require an expansion gap, and you'll need T-molding to hide the expansion gap. Once the floor is installed, hide the transition around the room edges with baseboard trim and/or quarter-round.

MODULAR FLOOR TILES

The final touch to the basement floor was an area rug comprised of modular carpet tiles from Flor Inc. (www.flor.com). These 50-centimeter squares are available in a huge array of colors and styles. We chose striped tiles in a multi-color pattern to brighten the décor and add warmth and softness to the floor. These can be used for wall-to-wall carpeting or to accent certain areas of the floor. An added

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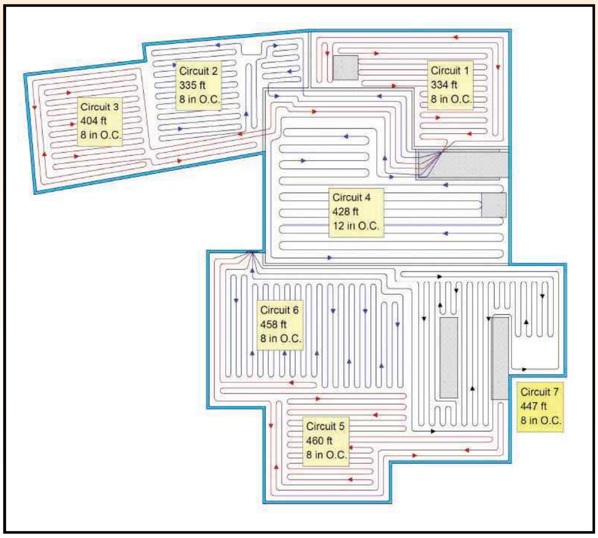
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Circuit 2
335 ft
8 in O.C.
Circuit 1
334 ft
8 in O.C.
Circuit 4
428 ft
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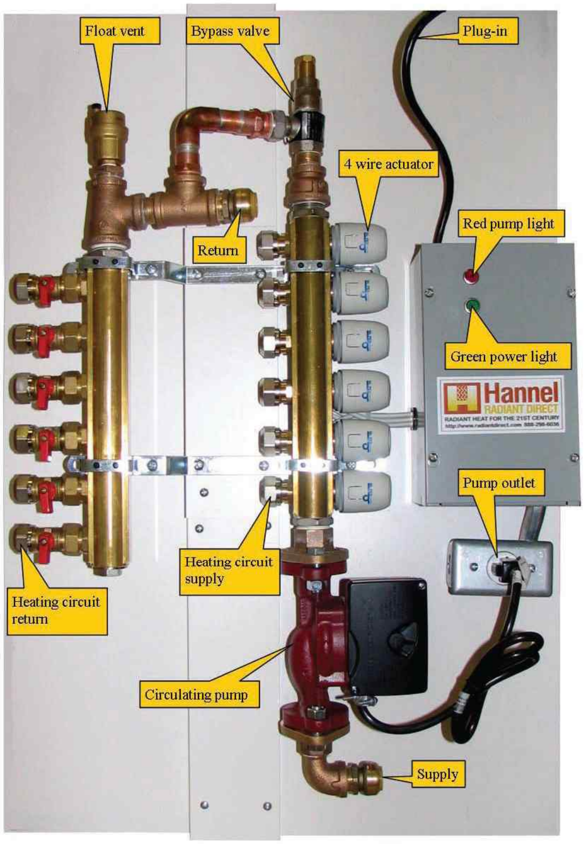
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benefit is that they're portable. If you want to move the carpet to another room or another home, just pull up the squares and re-install. And, if a square succumbs to a nasty spill, just replace that single square rather than the entire rug.

Installation couldn't be simpler. Just measure the floor to determine the quantity of tiles needed. Consider the use of patterns, accent colors and border tiles. Carpet squares give you all the creative design freedom of ceramic tile, only they're much easier to install. Lay the tiles on the floor with their seams butted together. In some cases it may help to snap a chalk line to keep the layout square with the walls. When you're satisfied with the layout, use the supplied adhesive discs, called Flor Dots, to anchor the squares together. Peel off the backing and place the disc, adhesive-side up, at the intersection of four tiles to adhere to the four corners and hold them together. Do the same around the perimeter of the carpet.

RECYCLE YOUR TRIM AND SAVE

Unless you're bound and determined to replace your existing baseboard trim with a new size or style, there's no reason to throw out the old woodwork when updating a floor. When you install the trim, you're going to invest labor in either new trim carpentry or in repairing the old trim. If you choose to repair the old stuff, you can save a bundle on materials costs and avoid measuring, cutting and coping new boards. Here are some tips.

Keep the walls and trim as intact as possible during removal. Before removing baseboards or quarter-round, always score the joint with a razor so dried caulk or paint doesn't cause a rip in the finish when you pull away the trim. Next, use a putty knife to open the seam, and then work a pry bar behind the trim piece all the way down to the sill plate inside the wall. Lever the pry bar against the 2-by-4 sill plate and flush with the floor, not above the plate where the end of the pry bar could pierce the wallboard at the stud cavity or break the base trim. Pry just enough to extract the baseboard nails loose from the wall, and then pound the board back in place to push the nail heads out. Then, pull all nails, working down the length of the baseboard. Pay attention to coped joints at the corners, which can pinch one baseboard behind another. Always remove the coped baseboard first.

As you remove the base trim, label the back of each piece for reassembly, i.e. "left wall, 1st piece," "Rear wall, 2nd piece," etc., otherwise you'll have a jigsaw puzzle to figure out when reinstalling.

Use a quality wood glue to repair any breakage in the wood. I usually squeeze in a liberal amount of adhesive and wrap the joint tightly with painter's tape until it dries. Use a color-matched putty to fill nail holes and repair surface damage. I chose white putty to match my white painted baseboards. Allow the glue and putty to completely cure, and then sand the baseboards smooth before repainting and nailing back in place. Caulk it, and you're good to go.

For wall-to-wall applications or any situation where the carpet tiles need to be cut, use a metal straight edge to guide a sharp carpet knife. Just score the flexible backing of the tile a few times to get a nice, clean cut.

TIME FOR FUN

After we reinstalled the baseboards—which took a lot of puttying, sanding and painting but saved a lot of material expense and trim carpentry—we had a brand new basement floor. And, it addressed the key considerations for basement living; insulation and moisture protection, as well as warmth, comfort and good looks. We then topped it off with new couches, a pool table and a big screen TV, ready and waiting for next football season. **EHT**

Adhesive discs, included with the carpet squares, are all that's required to hold the Flor tiles in place.

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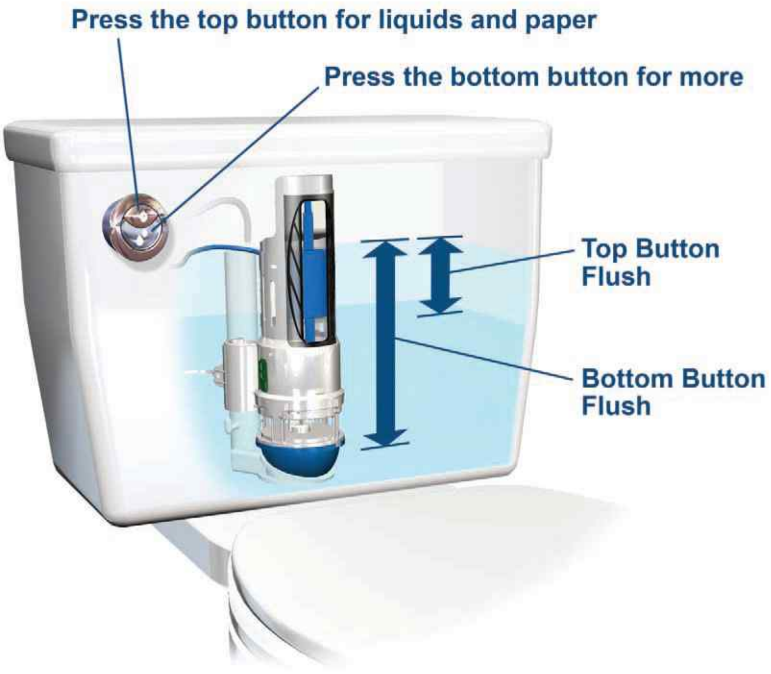
New water-conserving toilet valves can save money and resources.


Press the top button for liquids and paper
Press the bottom button for more
Top Button Flush
Bottom Button Flush

Replacing the valves in a toilet is an easy and inexpensive way to save thousands of gallons of water. This graphic shows the components of the HydroRight dual-action flush system.

By Matt Weber

In times like these, money matters a great deal, and saving is the name of the game. Reducing utility costs is a smart way to go. Take the example of Jefferson County, Alabama, headquarters of *Extreme How-To*. In recent years county residents have seen a steep increase in sewer rates. This is due in large part to some shady dealings at the hands of corrupt county officials, which resulted in the cost of a recent federally mandated sewer overhaul to be three times as much as the original estimate. A household around here pays 57 percent of its combined water/sewer bill for sewer usage, and only 43 percent for fresh water. It seems odd to me that it costs less to tap clean water than to flush it away, but that's the reality.

Our staff decided to conserve water was by gutting the tanks of a couple of old toilets and replacing the flush and fill valves with some new water-saving devices. Rather than upgrading to a new toilet, replacing the plumbing in a tank is easier, less expensive and can conserve even more water than many "high-efficiency toilets." According to independent research, upgrading the flush valve alone can save nearly 40 percent when compared to toilets equipped with a standard flapper valve.

We replaced the old ballcock valves in two toilets, both of which dropped nearly five gallons per flush. We installed two different conversion kits, the One2Flush system and the HydroRight system. Both of these products employ dual-flush technology to reduce water usage. To put it delicately, the dual-action valves operate with two separate flushing methods; use a small, conservative flush for Number One (liquids), and a more vigorous full flush for Number Two. The water savings result from the fact that residential toilets generally require only the small flush much more often than the big flush.

ONE2FLUSH DUAL FLUSH KIT & FILL VALVE

The One2Flush is the first kit we installed, which comes with the flush valve and lever preassembled from the factory. It costs less than $30, and if your toilet currently operates with a float-cup type fill valve, then the flush valve will be all you need. However, both toilets we were upgrading utilized the older ballcock mechanisms, so we also replaced the fill valves. In any case, the installation takes only a few minutes and requires only

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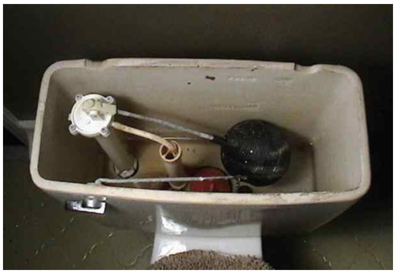
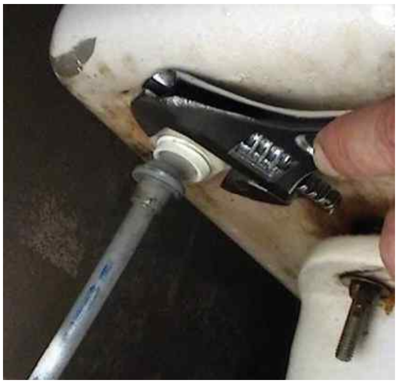
simple hand tools, like a wrench and pliers.

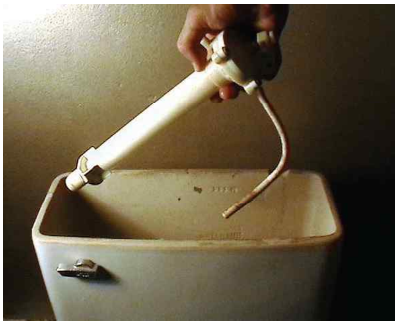
Begin by shutting off the water supply beneath the toilet. Flush the toilet and scoop out any remaining water from the tank with a cup. Use a rag to dry out the inside to prevent drips, then unscrew the tank supply line that connects to the fill valve.

Replacing the fill valve only takes a couple of extra minutes, and the advantage of the One2Flush fill valve is that it utilizes an adjustable micro-valve on the fill tube. During a standard fill cycle, water is usually draining into the bowl during the refill, which can waste as much as a gallon per flush. To solve this problem, the micro-valve allows you to determine how much water is used during the refill process, regulating the amount that goes into the bowl.

Swapping the fill valve is a direct replacement procedure—just unscrew the retaining nut from the bottom of the tank. Pop it out of the tank and stick in the new one, nestling the gasket in the tank hole and securing it with a new O-ring and retaining nut. The fill valve can also be adjusted by height to match your


Shown is the old ballcock valve, which we removed and replaced.


After shutting off the water supply, disconnent the supply line from beneath the tank.


Unscrew the retaining nut to remove the old fill valve.

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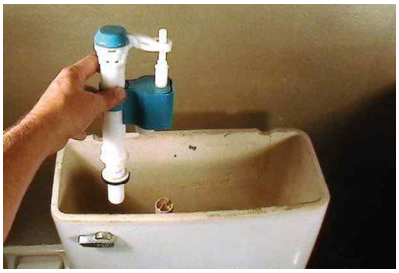
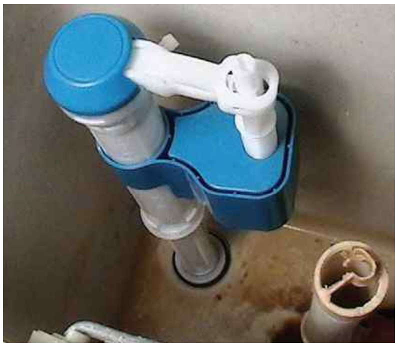
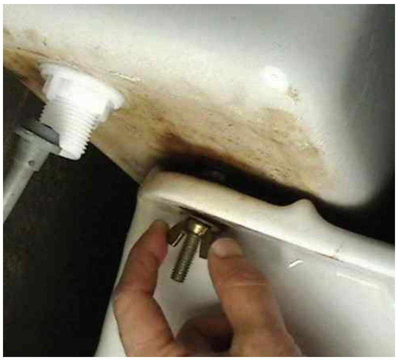


The One2Flush water-saving fill valve was used as the replacement.



Pull out the old valve and stick in the new one, simply securing it with a retaining nut from below.



Remove the tank by unscrewing the nuts on the tank-to-bowl bolts.

tank's specified water line by slightly rotating the cup and sliding it up or down the shaft of the valve. Reattach your water supply line whenever you're ready to fill the tank.

Next, use a wrench to back the nuts off the two tank-to-bowl nuts located on the underside of the tank. Choose a well lit area for your tank "surgery" and lay the tank on its side on a towel to prevent scratching the porcelain. Take the opportunity to use a good cleaner/degreaser product to scrub any gunk from the area between the tank and bowl, which will contribute to a better seal with your new gasket. Use a screwdriver to pry off the old gasket, and scrub that area clean as well.

Next, use a pair of Channellock pliers to unscrew the nut that holds the old flush valve in place. Then, use the pliers to unscrew the nut that mounts the flush handle to the wall of the tank—this unscrews clockwise.

Disassemble the One2Flush valve by giving it a 1/4 turn, which separates the valve body from the base. Remove the nut from the base. Place the base

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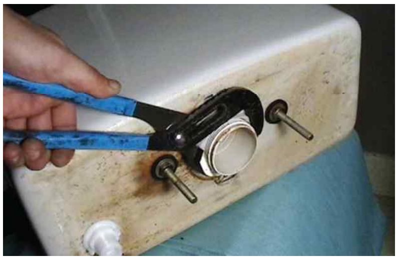
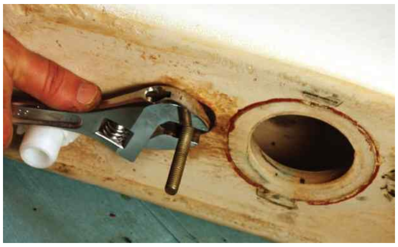
inside the tank, with its threaded end protruding through the hole in the bottom of the tank and protected from the inside with the included rubber gasket. On the underside of the tank, install the O-ring and spin on the nut to secure it in place. Place the new tank-to-bowl gasket over the nut and reinstall the tank.

From inside the tank, install the valve body in the base by simply aligning the two tabs on the bottom of the valve and twisting it tight.

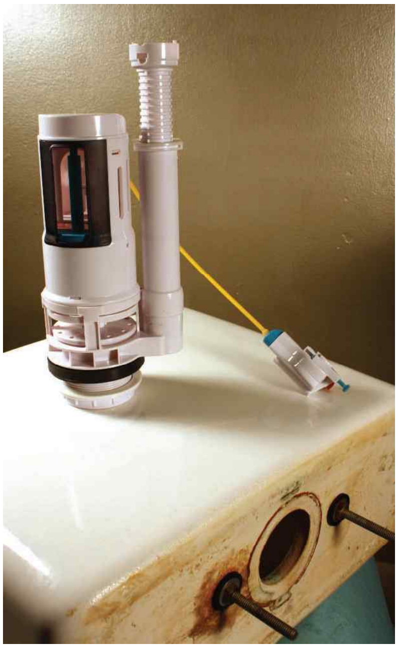
Just add the handle, and that's all it takes for the flush valve installation. The toilet is ready for action, and the valve is adjustable once installed so you can dial in your desired flushing action once everything is in place.



Use Channellock pliers to remove the large flush valve nut. Use a degreaser to help wipe away any grime.



The One2Flush valve comes with new tank-to-bowl nuts to replace the old ones.



The One2Flush valve comes preassembled from the factory.

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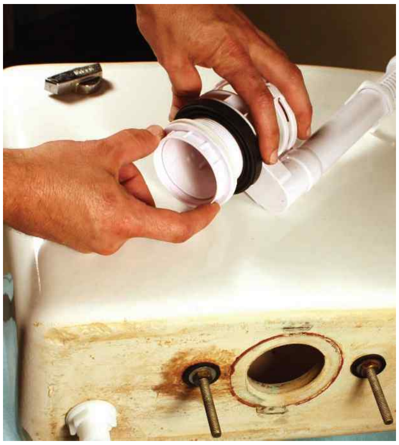
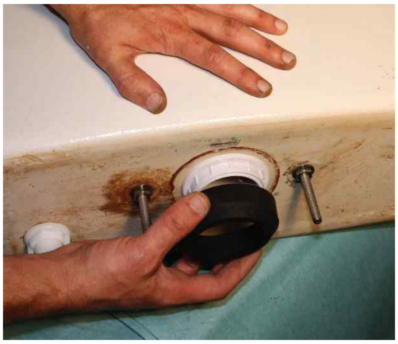
HYDRORIGHT DUAL FLUSH CONVERSION KIT

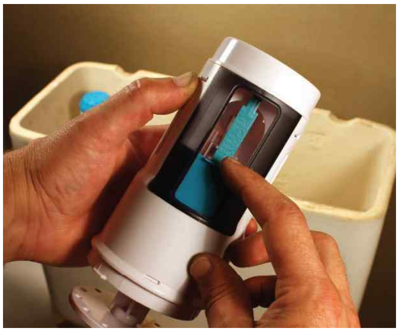
One advantage of the HydroRight system, from MJSI Inc., is that you may not have to remove the tank at all. The HyrdoRight dual flush valve replaces the flapper, installing directly over the overflow tube of your existing flush valve.



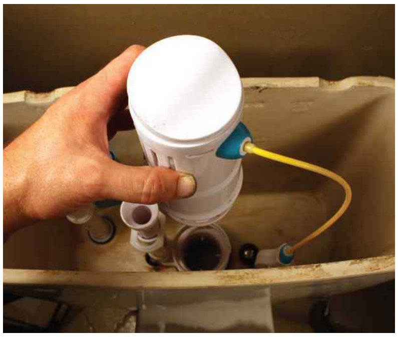
Separate the base from the valve.



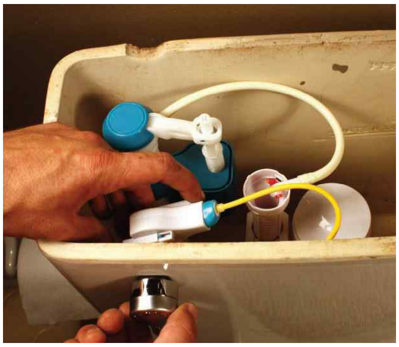
Install the base of the flush valve and apply the new tank-to-bowl gasket over the nut. Reinstall the tank.



The new flush valve features a slide to adjust the water level.



Reattach the flush valve to its base, locking it in place with a quarter turn.



Clip the fill line to the overflow tube of the flush valves, and then screw the flush handle in place.

To install, first shut off the water supply and drain the tank as explained earlier. Remove the flapper in the bottom of the tank and remove the flush handle and the chain that connects it to the flapper. Disassemble the flush valve with a quarter turn, which separates the valve body from the base. Slide the clamp of the base down over the old overflow tube, seating the blue silicone gasket into the flush valve opening. If there's a gap between the clamp and the overflow tube, use the cam adjuster (small plastic sleeve included with the kit) to tighten the fit. Next, slide the black rubber ring over the tube. Secure everything in place by pulling tightly on the zip tie that comes equipped on the clamp.

Rather than a flush handle, the HyroRight system utilizes a button mechanism to operate its dual flush feature. It's easy to install by screwing on a nut to hold it on the tank and then connecting it to the button cable with a quick-clamp feature.

Once installed, the flush valve can easily be adjusted to your desired flush volume by moving either the green or blue slide on the valve body. The green slide adjusts the full flush, and the blue slide adjusts the smaller, water-saving quick flush.

As with our previous toilet, we were again replacing a ballcock valve, so we upgraded to a cup-style fill valve, in this case the HydroClean 660. This easy-to-install fill valve is adjustable, so it conserves how much water is sent to the tank and bowl upon refill, reducing the water that drains down the bowl by as much as 36 percent. The 660 model also includes a pipeline full of cleaning jets that actually cleans the inside of the tank

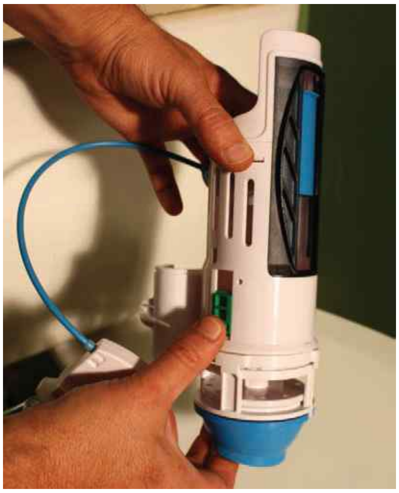
On the second toilet we installed the HydroClean 660 fill valve, which includes a pipeline of water jets that cleans the bottom of the tank.

with each flush, preventing the murky discoloration and sediment that often accumulates within the tank and contributes to seal failure and water leaks.

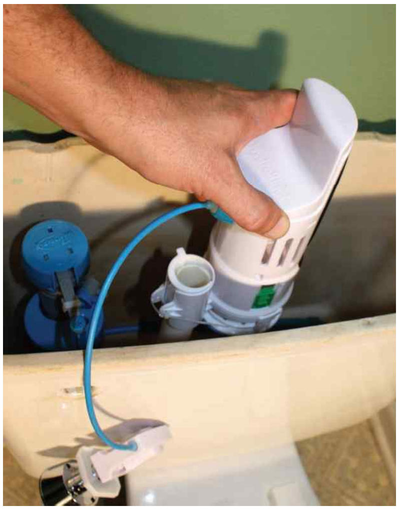
LEVER VS. BUTTON

We were impressed with the water-saving performance of both the HydroRight and the One2Flush, and we didn't find a notable performance advantage of one system over the other. Both are recommended to save thousands of gallons each year, reduce water/sewer bills and conserve resources in drought-stricken areas where water usage is limited. However, it should be noted that one difference is the style of the flush trigger.

The HydroRight's unique push-button method enables you to



The HyrdoRight flush valve features adjustments for the volume of water used in the quick flush and the full flush.



The HyrdoRight valve simply slips right over the existing overflow tube of the old flush valve, replacing the flapper.

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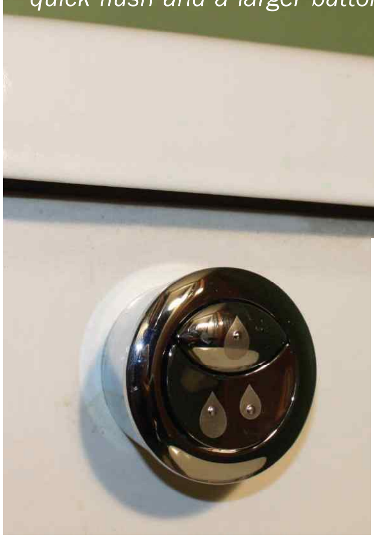
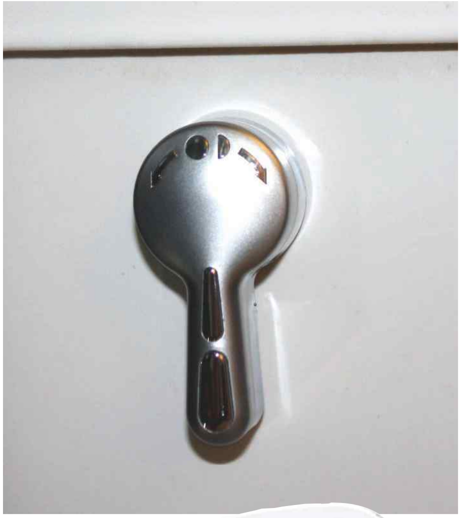
press a small button for the quick flush and a larger button for the full flush. It works fine, but the design of the mechanism means you won't be able to swap it for a different handle if you aren't happy with the look of the button design.

The One2Flush uses a more conventional lever-style handle, in which you flip it to the left for a small flush, to the right for a large flush. We did notice that when a toilet lid is left open it can hold the lever ajar and keep the toilet running. Fix this by closing the lid. According to women around the world, that should be standard procedure anyway. **EHT**

For more information on water-saving flush and fill valves, visit www.one2flush.com or www.gomjsi.com.

The flush triggers are different between the two products. The HydroRight features a dual button, a small one for the quick flush and a larger button for the full flush.





The One2Flush system uses a handle. Flip to the left for a quick flush, to the right for a full flush.

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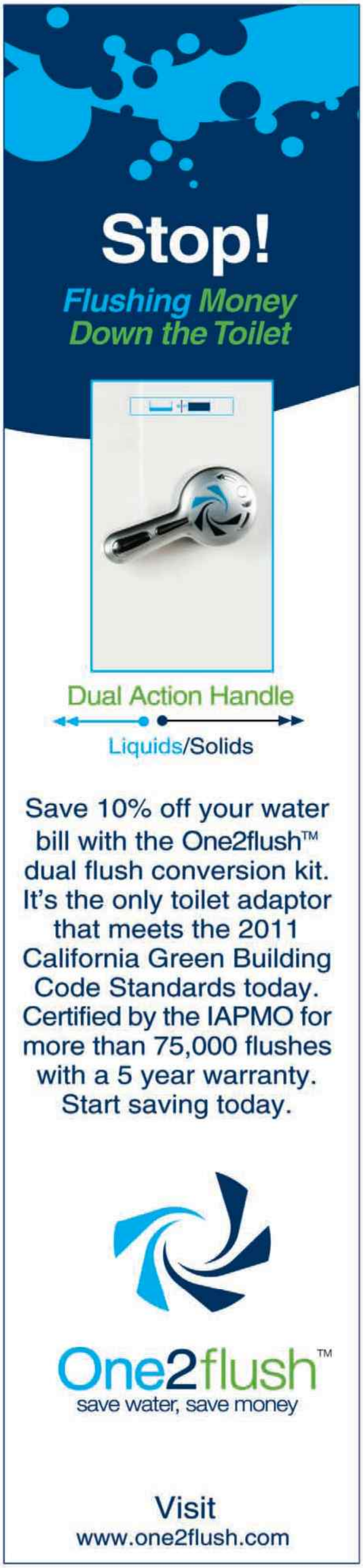
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Windows That Do More for Your Home

By Matt Weber

Imagine a window that helps ward off burglary attempts, helps protect against hurricane-strength winds, reduces sound penetration into the home and helps lower your energy bills. Sound too good to be true? Not if you're looking at today's high-quality storm windows with impact-resistant glass.

Just like a car windshield or aircraft windows, impact-resistant glass is produced by bonding a tough polyvinyl butyral (PVC) plastic interlayer between two pieces of glass under heat and pressure. Once sealed, the glass "sandwich" appears transparent, just like ordinary glass—but with impressive impact-resistant characteristics.

Originally created to help homes withstand the brunt of severe weather during hurricane conditions, impact-resistant glass has become popular for homeowners who want to protect their home from intruder attempts, household mishaps and outside noise penetration.

HOME SAFE HOME

Whether you're leaving on vacation for several weeks or just going to the grocery store for an hour, you want the peace-of-mind of knowing that your home will be safe and secure while you're gone. Impact-resistant glass, such as the Keepsafe Maximum glass requested in Simonton Windows' StormBreaker Plus products, provides this assurance.

"We are so confident in the ability of these impact-resistant windows and doors to help deter burglars that we've teamed up with Solutia, the manufacturer of Keepsafe Maximum glass, to offer a break-in warranty for homeowners," says Rebecca Taylor, coastal product manager for Simonton Windows. "If an intruder breaks through this glass, the warranty will cover the lost/stolen property and 100 percent of the insurance deductible up to $1,000. That's impressive."

Taylor says that testing with baseball bats, crowbars and even air cannons continue to show that the Keepsafe Maximum glass can not be significantly penetrated to allow someone to break into a home. The impact-resistant windows and doors, which can be used for both replacement and new construction projects, feature durable steel or aluminum reinforced vinyl frames and impact-resistant laminated glass. This powerful combination helps protect the home against windborne debris during high wind events or from repeated strikes by an intruder during a burglary attempt.

"In supervised Solutia testing conditions, KeepSafe Maximum glass stands up to repeated blows from bats, bricks, crowbars, hammers and other common burglary tools," says Taylor. "Since they can withstand severe testing conditions, the glass in these windows can easily handle the impact of an occasional stray baseball or golf ball. Even if broken, the glass fragments tend to adhere to the interlayer, thus helping to reduce the danger of serious injury."

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SSSHHH … NOISE CONTROL

Here's an easy question. What do the following three things have in common: honking car horns, barking dogs and your neighbor's favorite rock band? The answer: They're all annoying noises that you can prevent from entering your home if you have impact-resistant windows and doors.

The same laminated glass package that helps protect the home from bad weather and intruder attempts also helps lower the transmittance of outdoor noises into the home. With StormBreaker Plus windows, this can be achieved by 50 percent over standard windows. Double hung, picture and casement windows in the product line have a Sound Transmission Classification (STC) rating of 35. Similar styles of traditional replacement and new construction windows have an STC rating of 25 to 28.

"The highest STC rating you can have for a window is 38 to block out exterior sounds, so with a 35 rating, these windows rank high in preventing noise infiltration into the home," says Taylor. "Research shows that an improvement of 5 STC rating points equates to a 50 percent reduction in noise reaching into the home. This is really significant for homeowners who want to keep 'home sweet home' as 'home quiet home' so they can more fully enjoy their living conditions."

Savannah homeowner Nancy Zeman has seen the multiple benefits of her Simonton StormBreaker Plus windows. During the renovation of her 1900s two-story Victorian-style home she decided to invest in two dozen impact-resistant windows because of her home's relatively close location to the shore.

"Fortunately we haven't experienced a hurricane, but we still gain the noise control benefits of these windows every day," says Zeman. "This house has 12-foot ceilings. Along with dampening the exterior noises from entering the home, these windows help reduce energy costs because they screen out 99 percent of the sun's most damaging rays. As soon as they were installed, I noticed a 40-percent drop in my energy bills. And, if a storm does come, I can evacuate quickly because these windows require no shuttering systems."

LAUGHING AT MOTHER NATURE

In Houston, Texas, Jill Hasling takes the weather very seriously. As the executive director of the Weather Research Center, she forecasts hurricanes and works daily with anticipating weather trends.

When the center opened its doors in 2006 to the country's first national museum dedicated to weather, they did so with Simonton StormBreaker Plus windows throughout their renovated 5,000-square foot structure. "We operate a worldwide forecasting center and make predictions for upcoming hurricane seasons, so we absolutely know how real the threat of hurricanes can be to our area," says Hasling. "Creating a safe, functional and appealing environment for the museum was a high priority for us. It only made sense to have hurricane-resistant windows installed."

Hasling's foresight proved fortunate, when in 2008, Hurricane Ike slammed into Houston.

"This was a wicked hurricane with wind gusts up to 90-mph that knocked out power and windows in many area homes and businesses," says Hasling. "The meteorologists who worked through Hurricane Ike reported flying debris and tree limbs continually hitting the windows, however there was no damage. And, we were all truly amazed that the sound of the wind was

Nine pound piece of lumber hits window at a rate of 50-feet per second during testing.

Victorian-style home in Savannah, Georgia, with impact-resistant Simonton StormBreaker Plus windows.

also muffled by these durable windows."

MORE FOR THE MONEY

According to Simonton's Taylor, homeowners are asking their windows to "do" more than ever before. "Windows used to simply allow light into the home," says Taylor. "Today windows can help play a vital role in saving overall energy costs, protecting the home during severe weather and intruder attempts, and reducing ambient noise traveling to the interior of the house.

"Windows with impact-resistant glass packages are an investment for homeowners that pay off. You can lower energy bills immediately, reduce your homeowner's insurance premiums and receive a break-in warranty that covers lost/stolen property. On top of this, you can reduce the noise penetration into your home. And, if replacing your windows in 2010, you can take advantage of the federal energy tax credit that provides homeowners up to $1,500 in tax credit for installing energy-efficient windows."

To find more information on impact-resistant windows and doors that can add safety, security and lower energy bills to your home, visit www.simonton.com.

Simonton Windows strongly advises homeowners to observe and obey all local authorities and evacuation notices in the event of a hurricane or severe weather event.

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When a job requires that you work on your knees, pull out the compact Tool Box Kneeler for comfort and support. Made of soft but supportive foam, the Tool Box Kneeler is engineered for tradesmen and DIY'ers with limited space for safety tools. This lightweight kneeler is convenient to have on all jobs and it fits in most professional toolboxes for easy transport and storage. The kneeler is made from a black, rugged "closed cell" foam that hides stains and dirt, yet cleans easily with soap and water. The Tool Box Kneeler is resistant to fuel oil, PVC glue and primer and will not absorb water if punctured. Learn more at www.ergopads.com.

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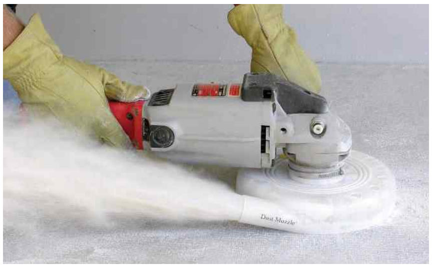
ONE SIZE DUST MUZZLE ULTRA FITS ALL GRINDERS

The Dust Muzzle Ultra is a new and improved version of the popular Dust Muzzle dust-extraction system that was patented in 1991. Two sizes fit all grinders—the DMU5 fits all 4- to 5-inch grinders, and the DMU8 fits all 7- to 9-inch grinders. The Ultra is the most efficient, easy-to-use Dust Muzzle available for hand grinders. It installs in minutes and can be adapted for crack chasing, tuck pointing or zero-clearance grinding along walls and in corners. It uses a flexible adapter ring that eliminates the common problem of hose clamp "pinch-off" and allows it to attach firmly to all grinders. It is made from a durable polypropylene polymer that is flexible down to -20 degrees and will not crack. The Dust Muzzle Ultra can also be used with diamond-cup wheels, Zec wheels, soft pads and many more applications. Learn more at www.dustmuzzle.com.



LUSTERSTONE

LusterStone is an innovative architectural coating that produces beautiful, reflective stone-like patterns. The product is simple, versatile and easy to repair. The nature of the material allows it to be used to create a stunning variety of high/low dimensional finishes that do not require burnishing to obtain designer-quality results. LusterStone can also be applied to irregular surfaces such as ironwork and assorted fixtures by brush or spray. It is available in quart or gallon sizes in a wide range of colors. For application instructions and to learn more about the product, visit www.fauxcenter.com.

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HOT PRODUCTS

SCORPION COATINGS SOLUTIONS FOR CONSTRUCTION

Two truck-bed liner companies, Scorpion Protective Coatings and Al's Liner have recently partnered to provide high-build coating solutions for construction and renovation projects. "Scorpion has been used in commercial, military, and municipal markets for more than a decade," says Jim Mitchell, National Sales Manager at Scorpion. "Our experience, combined with the ease of use and convenient packaging of Al's Liner allows for a premium polyurethane coating to be available to all areas of the construction and renovation market, from the DIY guru to the professional contractor." Scorpion is a perfect option for stucco-look retaining walls or covering deteriorated wood sidings, an excellent liner for ponds and waterways, or a non-skid, long-lasting coating for decks and walkways. Learn more at www.scorpioncoatings.com and www.alsliner.com.

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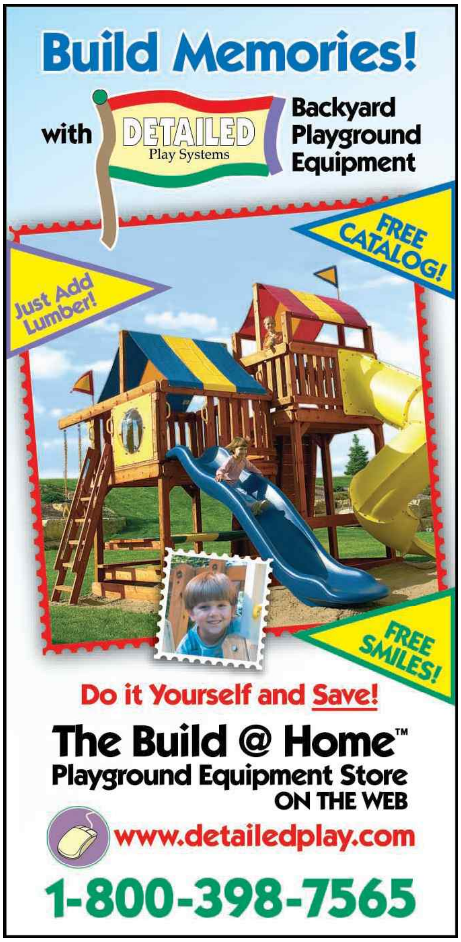
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LED SURFACE-MOUNT DOWNLIGHTS FROM SEA GULL

Sea Gull Lighting's new LED surface-mount downlight fixtures have received the residential Energy Star qualification from the U.S. Department of Energy. Designed with JuiceWorks, an LED lighting technology company, these new fixtures are designed with the latest LED technologies to consume 85 percent less energy than incandescent fixtures and 40 percent less than equivalent compact fluorescent lighting (CFL's). Sea Gull Lighting's new LED surface mount downlight fixtures deliver superior performance, efficiency and maximum usable light. In addition, the new line is especially designed with a retrofit surface-mount light kit that allows users to easily convert existing recessed lighting to energy-saving LED.

The new products include sophisticated optics that maximize light output and usable lumens per watt, as well as a thermal management system that allows select LED chips to run cooler and enhance product life.

Learn more at www.SeaGullLighting.com.

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